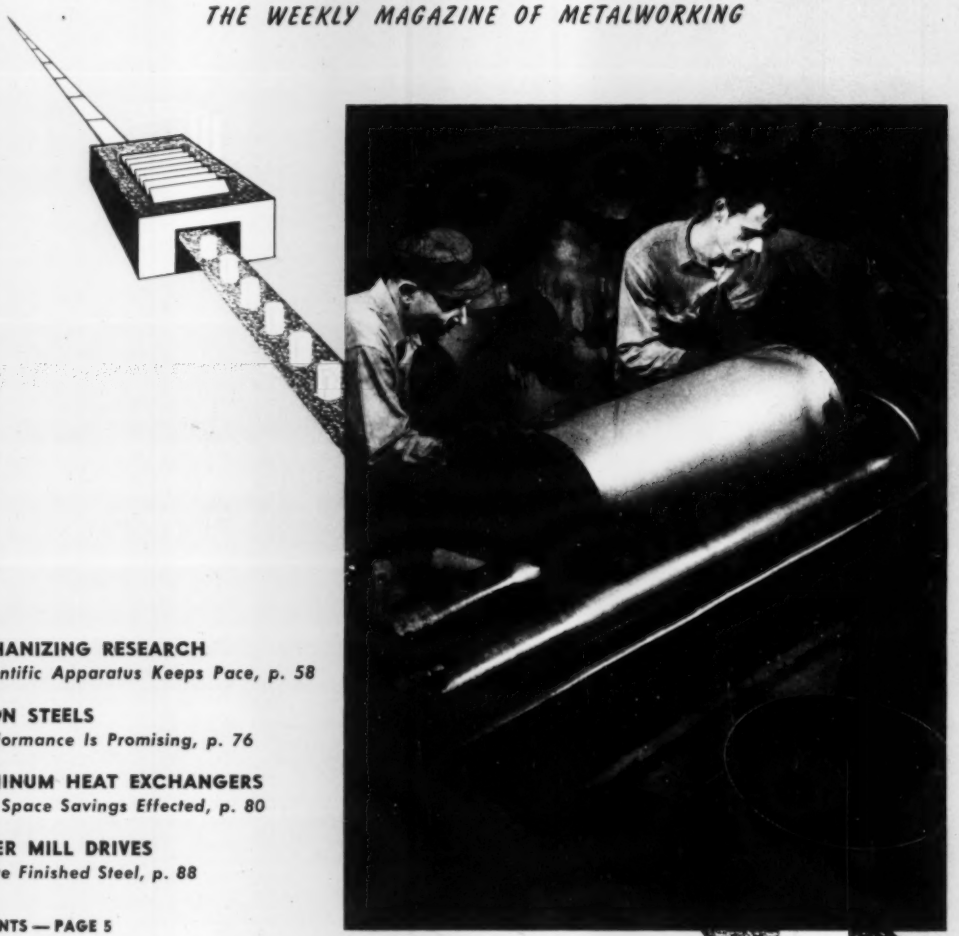
OCTOBER 15, 1951

STEEL

THE WEEKLY MAGAZINE OF METALWORKING



MECHANIZING RESEARCH
—Scientific Apparatus Keeps Pace, p. 58

BORON STEELS
—Performance Is Promising, p. 76

ALUMINUM HEAT EXCHANGERS
—Big Space Savings Effected, p. 80

FASTER MILL DRIVES
—More Finished Steel, p. 88

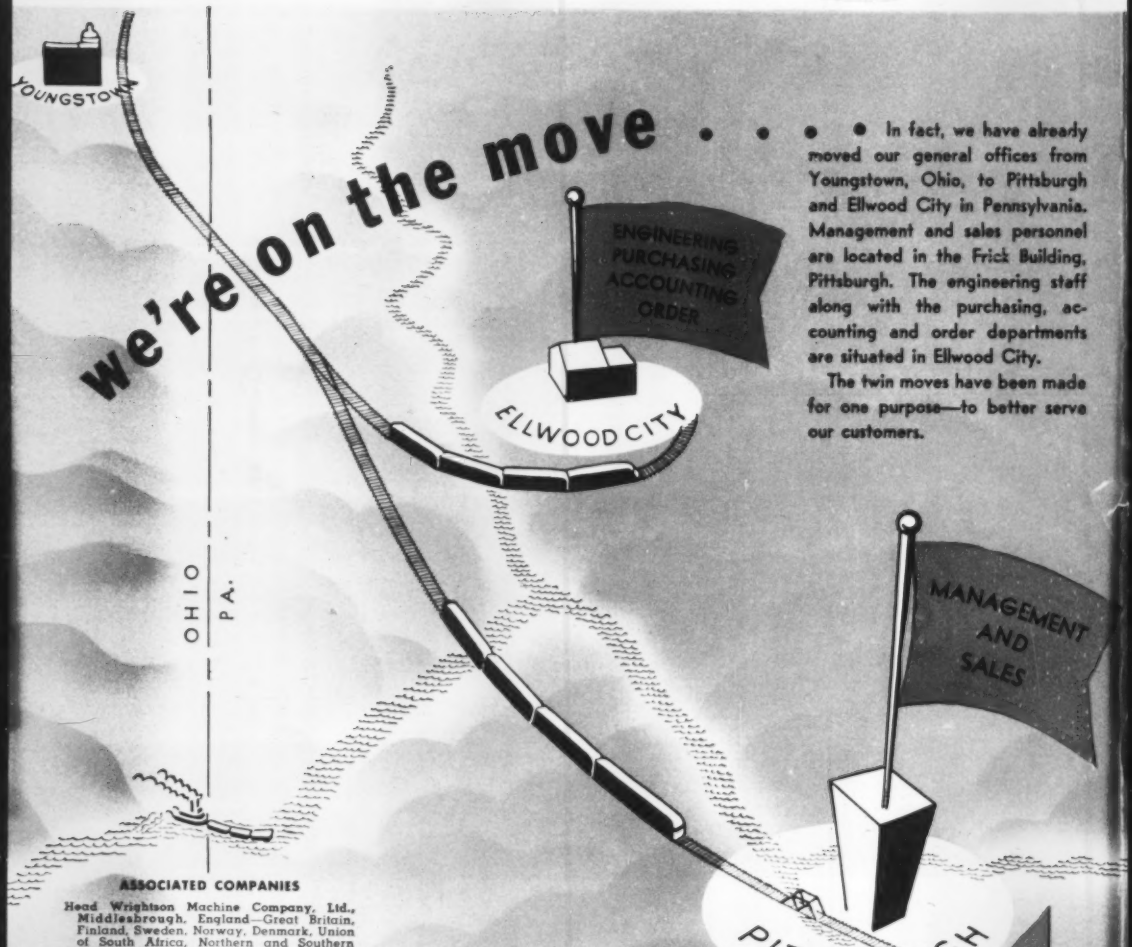
CONTENTS — PAGE 5

GET MORE PRODUCT

per ton of steel **—see page 47**

Fifty years

OF CREATIVE ENGINEERING



• • • In fact, we have already moved our general offices from Youngstown, Ohio, to Pittsburgh and Ellwood City in Pennsylvania. Management and sales personnel are located in the Frick Building, Pittsburgh. The engineering staff along with the purchasing, accounting and order departments are situated in Ellwood City.

The twin moves have been made for one purpose—to better serve our customers.

ASSOCIATED COMPANIES

Head Wrightson Machine Company, Ltd., Middlesbrough, England—Great Britain, Finland, Sweden, Norway, Denmark, Union of South Africa, Northern and Southern Rhodesia.

Aetna-Standard Engineering Company, Ltd., Toronto, Ontario, Canada.

M. Castellvi, Inc., New York, N. Y.—Mexico, Central and South America.

Societe de Constructions de Montbard, Paris, France—France, Belgium, Holland, Luxembourg, Switzerland.

Demag Aktiengesellschaft, Duisburg, Germany—Germany, Austria, Yugoslavia, Greece, Turkey, Egypt.

Compagnia Italiana Forme Acciaio, Milano, Italy—Italy.

Aetna-Japan Company, Ltd., Tokyo, Japan—Japan.

Hale & Kulgren, Inc., Akron, Ohio—Representative for the Rubber Industry.

Designers and Builders to the Ferrous, Non-Ferrous, Leather and Rubber Industries

aetna-standard

THE AETNA-STANDARD ENGINEERING COMPANY • PITTSBURGH, PA.

Plants in Warren, Ohio • Ellwood City, Pennsylvania

Tool Steel Topics

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Lehigh H Shear Blades To Blame for Idle Time

The other day a Bethlehem salesman was surprised to find one of his good customers, a shop boss, in a somewhat hostile mood for no apparent reason. "You've got me in real trouble," the boss said. "Remember that Lehigh H steel you suggested we use for shear blades?"

"Why, yes, I do," admitted the salesman.

"Well, come with me," replied the customer. "I want to show you something."

They walked out in the shop where the shear blades were used to cut steel and brass strip. So far as the Bethlehem man could see, the blades seemed to be working fine. He looked at the customer and this time he detected a twinkle in his eye.

Leisure for Tool Grinder

"See that fellow over there?" And the customer pointed to a workman who was reading the morning paper. "That's our tool grinder, and he's a good one, too. He used to spend most of his time grinding blades. But those blades we made out of Lehigh H just seem to last forever. And every morning I have to rack my brains to find something else for him to do!"

The boss had a good laugh. Then he gave the salesman an order for more Lehigh H tool steel. He could afford to have his tool grinder idle much of the time. His shearing costs had been sliced in half.

High-carbon, high-chromium Lehigh H is just what the experienced toolmaker needs wherever maximum wear and minimum distortion are important. It's air-hardening, safe for intricate dies, thin sections, sharp corners. And it's deep-hardening, with high compressive strength for heavy-duty tools and dies.

Ten Times More Necktie Clasps with Hobbed Molds of Duramold A

Here's another enthusiastic report on Duramold A, our 5 per cent chromium, air-hardening hobbing steel. Hobbed for zinc die castings, this special-purpose steel has upped the life of molds by at least 1000 pct, according to Peerless Engineering Co., Inc., South Gate, Calif. In the casting of novelty necktie clasps, the die sets of Duramold A were examined at a time when previous molds had to be discarded. The Duramold A cavities showed no evidence of checking or sinking; and the surface finish appeared to have actually improved with use.

M. T. Derby, chief tool engineer for Peerless, sums it up:

"We like Duramold A because it's easy to hob. In making multiple cavities we get good detail and accuracy with fewer machine-hours. For most of our work we need a steel that gives us a high polish in the cavities with a high hardness that will stand up under zinc-injection molding at high pressures and temperatures. We've found Duramold A to have good core strength, it doesn't sink readily, and we can expect to get long runs with very little maintenance."

Whether used for die-casting or plastic-molding Duramold A is a real improvement over hard-to-hob steels. Its 5 pct chromium content provides plenty of wear-resistance and core strength . . .

Duramold A is hobbed in one push in a 300 ton press by the master hob shown at top. Eight necktie clasps are cast at one time, the molten zinc being injected at 800 F and 2000 psi; mold temperatures reach about 500 F.

and its air-hardening properties hold distortion to a minimum during heat-treatment.

Its typical analysis:

C	Mn	Si	Cr	Mo
0.07 max	0.40	0.20	4.50	0.45

Booklet 271 will help you select the right tool steel — for hobbed molds, machine-cut molds, or master hobs. Address your request to our Publications Department, Room 1041, Bethlehem, Pa.

Our Tool Steel Engineer Says:

Poor tool design can cause cracking in heat-treatment

Proper attention paid to tool design can often prevent the cracking of tools during heat-treatment. Too often the heat-treater is asked to harden tools which cannot be quenched properly. One frequent design fault is a tool having a heavy section adjacent to a light section. Unnecessarily sharp corners is another design fault that can cause cracking. Provide fillets wherever sharp corners are not essential.

Bethlehem ULTRASONIC TESTED **Tool Steel**

SILENTLY, but ruthlessly *(even as you are reading this)* rust is gnawing away at machines, tanks, fences, pipes, fire escapes, metal sash, stacks —every rustable metal—inside and outdoors!

To protect your investment — to keep every possible pound of new steel for the defense program — to make all rustable metal surfaces last longer—*adopt rust control with RUST-OLEUM as an important part of your maintenance program.*

RUST-OLEUM stops rust! Its tough, pliable, rust-resisting film gives excellent protection that prevents rust losses under many difficult rust-producing conditions.

RUST-OLEUM can be applied *even* over rusted sufaces. It is not necessary to remove all the rust. Just use wire brush and sharp scraper to remove rust scale and loose rust. Economical and easy to use because no sand blasting or chemical pre-cleaning is required.

RUST-OLEUM can be obtained promptly from Industrial Distributors' stocks in principal cities of the United States and Canada. Anticipate your needs and order now! For complete catalog see *Sweet's,* which also lists your nearest source of supply, or write on your company's letterhead for full information.

RUST-OLEUM CORPORATION
2532 Oakton Street, Evanston, Illinois

"Rigid Economy Men!"

RUST-OLEUM
Stops Rust

Beautifies AS IT PROTECTS

Available in many **COLORS,** aluminum and white.

TRADE MARK

REG. U. S. PAT. OFF.

Presenting

a NEW MARK of Long-Established Quality

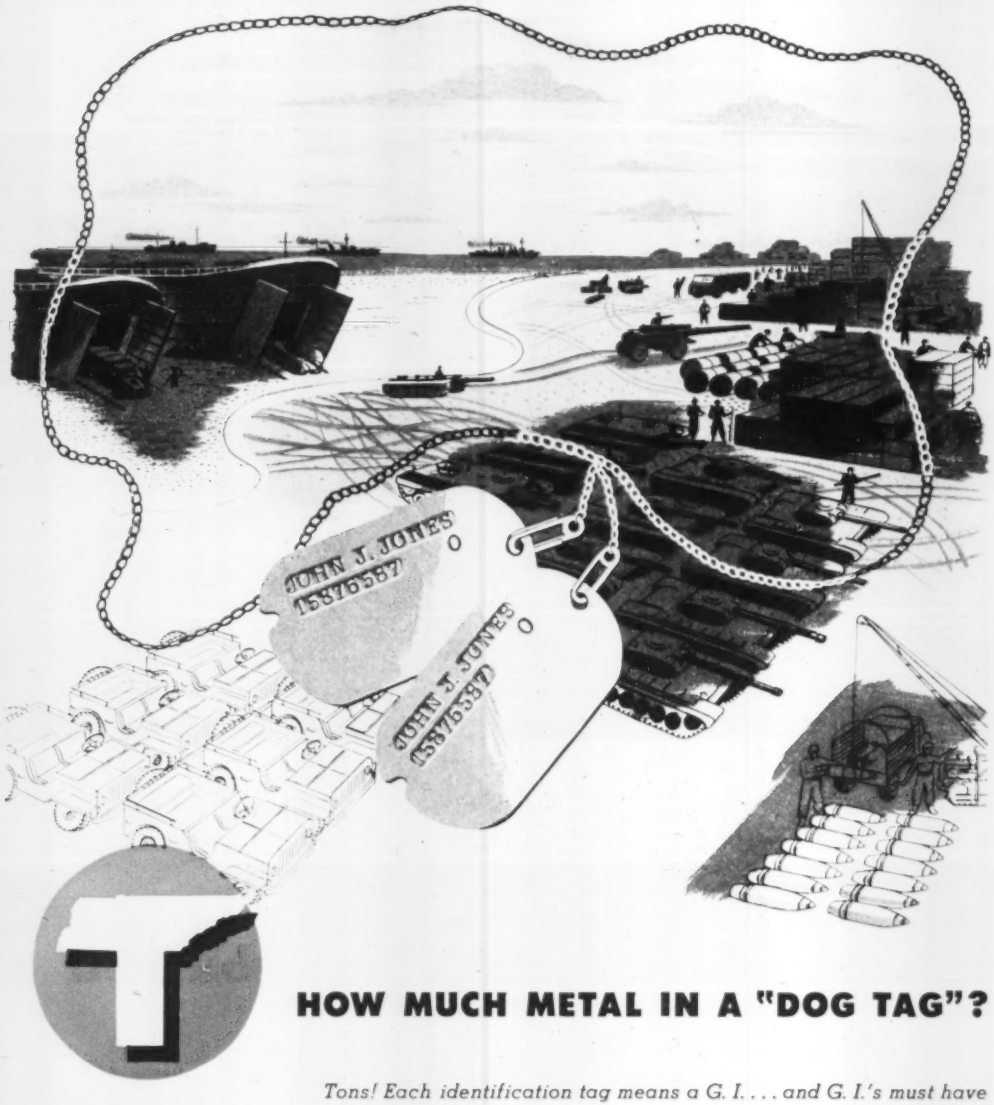
Since 1878 and the earliest bicycle cyclometer . . . to the present day when counters are built into everything from hay-balers and textile looms to jet planes and gasoline pumps . . . Veeder-Root has been "the name that counts."

Today, Veeder-Root is the world's largest manufacturer of counting and computing devices for mechanical, electrical, and manual operation. And as a symbol of "the name that counts," this trademark has been developed as a hallmark of old-fashioned quality and modern design *in everything that counts.*

So when you buy counters, look for this mark, and remember: V-R stands for Veeder-Root . . . and also for *"Value Received."*

VEEDER-ROOT INCORPORATED
"The Name That Counts"
HARTFORD 2, CONN. • GREENVILLE, S. C.
Montreal, Canada • Dundee, Scotland
Offices and agents in principal cities

Veeder-Root COUNTERS *"Count Everything on Earth"*



HOW MUCH METAL IN A "DOG TAG"?

Tons! Each identification tag means a G. I. . . . and G. I.'s must have guns, jeeps, tanks, planes, ships as well as countless other metal weapons and tools. Where does Tennessee come in? Why, in every one of these things!

You can't see Tennessee's chemical and metallurgical products in any of them. But they're there. And they're in virtually everything the G. I. uses. The people at Tennessee are proud of it, too.

The many thousands of things essential to the defense program take up a major part of our production now. We appreciate the patience of our many friends in industry during these critical times and are looking forward to the time when our full capacities can again be available to serve them.

TENNESSEE
PRODUCTS & CHEMICAL
Corporation
NASHVILLE, TENNESSEE

PRODUCERS OF: FUELS • METALLURGICAL PRODUCTS • TENSULATE BUILDING PRODUCTS • AROMATIC CHEMICALS • WOOD CHEMICALS • AGRICULTURAL CHEMICALS

STEEL
The Weekly Magazine of Metalworking

VOL. 129 NO. 16 OCTOBER 15, 1951

THIS WEEK IN METALWORKING

NEWS

Behind the Scenes	6
Letters to the Editors	12
The Metalworking Outlook	39
As the Editor Views the News	43
Get More Product from Every Ton of Steel	47
The Metalworking Contract Summary	51
Checklist on Controls	52
Windows of Washington	53
Mirrors of Motordom	61
The Business Trend	65
Men of Industry	69
Obituaries	72

PRODUCTION-ENGINEERING

Production and Engineering News at a Glance	75
Boron Engineering Steels	76
Big Space Savings Realized in Brazed Aluminum Heat Exchangers	80
Seen and Heard in the Machinery Field	83
Tough Coating Opens Way to New Uses of Porcelain Enamel	84
Careful Battery Maintenance Reduces Truck Downtime	86
Progress in Steelmaking—Faster Mill Speeds Increase Rolling Capacity	88
Calendar of Meetings	118
New Products and Equipment	123
Helpful Literature	137

MARKETS

The Market Outlook	141
Metal Price sand Composites	142
Nonferrous Metals	153
Metalworking Briefs	163

Editorial and Business Staff—Page 10. Advertising Index—Page 170. Editorial index available semiannually. STEEL also is indexed by Engineering Index Inc., 29 West 39th St., New York 18.

Next Week: **... Improved Enamels Extend Life of Steel Chlorination Pipe ... Titanium Machines Like Jet Engine Alloy ... Bar Mill Rebuilt in Three Weeks**

Published every Monday by the Penton Publishing Company, Penton Building, Cleveland 13, Ohio. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $10; two years $15; all other countries, one year $20. Single copies (current issues) 50 cents. Metalworking Yearbook issue $2.00. Entered as second class matter at the postoffice in Cleveland, under the Act of March 3, 1879. Copyright 1951 by Penton Publishing Co.

6 INSIDE REASONS

1 Helical, wear-hardened gears cut from alloy steel forgings and shaved before hardening for correct eccentricity and helical angle and bright, smooth surfaces — factors contributing to quiet operation and longer life.

2 Gear arrangement in simple train minimizes number of moving parts — promotes quietness.

3 Pinion and gear supported and spaced to reduce deflection — permits high load-carrying capacity.

4 Splash system with large oil reservoir assures constant and thorough lubrication of all parts.

5 Anti-friction bearing construction throughout.

6 Reliance *Precision-Built* Motors provide the maximum in dependable and economical power.

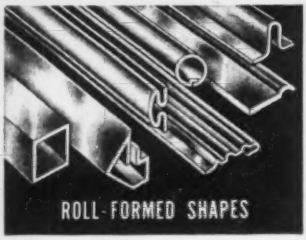
RELIANCE Precision-Built MOTORS

Write for GearMotoR Bulletin E-2404

Sales Representatives in Principal Cities

RELIANCE
ELECTRIC AND ENGINEERING CO.
1081 Ivanhoe Road • Cleveland 10, Ohio

"All Motors are NOT Alike"



Let Werner light metal shapes help you meet "D.O." deadlines.

You can get prompt delivery of "custom" shapes in extruded aluminum, as well as roll-formed aluminum, stainless steel, brass, zinc and copper. Shapes are manufactured to close tolerances, to your exact specifications. Quality is assured by Werner's extensive manufacturing and engineering experience, plus full production facilities, including tool-and-die-making equipment.

For an estimate, send drawing and specifications, plus data on quantity, finish, length, etc. Werner can perform the following secondary operations—bending, drilling, punching, cutting, counter sinking and welding. Finishes—as extruded, polished or anodized.

R. D. WERNER CO., INC.
295 FIFTH AVE., N. Y. 16, N. Y. • PHONE MU 6-2595

MANUFACTURERS OF ALUMINUM EXTRUSIONS AND ROLL-FORMED SHAPES

Send to:
R. D. WERNER CO., Inc., Dept. S
295 Fifth Ave., New York 16, N. Y.
FREE bulletins describing manufacturing facilities and telling when to choose extruded or rolled shapes.

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

Behind the Scenes...

One World

This is the week of the World Metallurgical Congress in Detroit, sponsored by American Society for Metals. We've had a personal preview of the climate of opinion that will prevail there because about a week ago we invited four of the conferees from abroad for a Sunday afternoon visit with us. They were in Cleveland with about 15 other delegates from overseas for some plant visitations.

We drove down to the Hotel Statler to pick them up. Although the day was raw and blustery and none of the gentlemen were precisely youthful, all were hatless and three were coatless. A delegate from Australia had the coat but he apologetically explained that he was used to a semitropical climate. We—attired in top coat, scarf, gloves and a hat—said that the weather was unusually cold for early fall.

"Seems nice enough to me," said the Englishman.

"It's really been too warm, thus far," chorused two gentlemen from Sweden.

On the ride out to our house, we learned that the Australian was connected with a public utility, that the Englishman was with the Ministry of Supply in charge of procurement of aircraft materiel, that one Swede was an engineer with a company making welding electrodes and that the other had a position with an electric steel maker.

All four showed great interest in our 1946 Mercury and expressed astonishment—with which we agreed—that the car was only getting 13 miles to a gallon of gas. At our house the television set was on when we arrived, so they all clustered around it. England and Australia have television, but Sweden does not. They asked us learned questions about the lines per square inch or something on the screen, but we had to confess our ignorance. They wanted to see the other much-vaunted gadgets in the American home, so we took them on a tour.

We became tangled up in an explanation of how the dishwasher works and couldn't say what b.t.u. content our gas furnace delivered. But when the Australian asked on what principle the unit operated, we reported briskly: "Warm air, gravity flow."

When the tour was finished, we all sat in the living room.

The Swedish gentlemen came out with no definite opinions about America but did say that it was nice to live in an historically neutral country that hasn't had a war in decades.

We discussed housing, education, the cost of living and Russians. On all points we agreed that the outlook was dark. The Swedes have had a first hand contact with the Russians because a lot of them were in their country during a five-year Swedish-Soviet commercial agreement.

"The Russians have to cable Moscow for permission to say, 'Hello, it's a nice morning'," said the Swede from the welding electrode firm. "All of them have to leave some close relative back in Russia whenever they travel abroad in case they decide they like it better outside."

The conversation veered back to television, so we turned the set back on. In the space of a little more than an hour, three juggling acts appeared.

"What did all these jugglers do before the war when there was no television?" we asked.

"We wonder the same thing," said the Englishman sadly.

Shift

Associate Editor Dan Reebel will be STEEL's new Pittsburgh editor. Dan was advertising manager of Mesta Machine Co. before he resigned in 1947 to join us. One of Dan's primary interests is in technical developments in steelmaking and he will continue to follow them, along with new work of reporting on news and markets in the nation's steel capital. Our former Pittsburgh man, Bill Humphries, has resigned to go with Pittsburgh Coke & Chemical Co.

Puzzle Corner

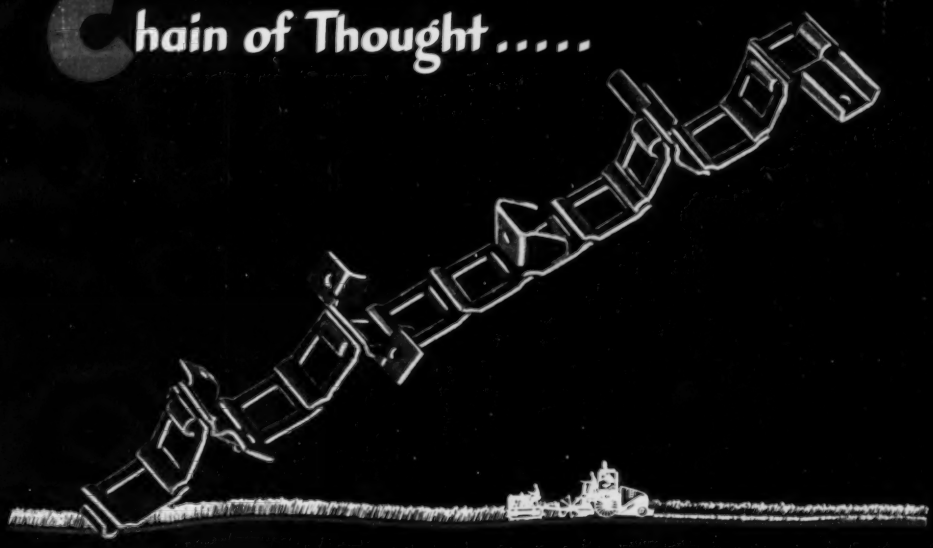
In the puzzle of Oct. 1, car A went 150 mph, car B 140 mph and car C 160 mph. The length of the course was 350 miles. First in with that answer were Roger I. Fluck of Bethlehem Steel Co., C. E. Blass of Talon Inc., Ralph Pappenheimer of Specialty Device Co., James F. O'Neill of Westinghouse Electric Corp., C. E. Norton of Highland Park, Ill., Bob Knop of Wolverine Tool Co.

How many pieces of type does a printer need in order to set up the page numbers of a 288-page book if he does not use any pieces twice?

Shrdlu

(Metalworking Outlook—Page 39)

Chain of Thought.....



SHARON* SPECIAL ALLOY ADDS STRENGTH TO FARM IMPLEMENT CHAINS

The chain used on farm implements today is tougher, more rust resistant, easier working and less expensive than ever before. This is a direct result of cooperation between chain makers and the steel industry.

While manufacturers were developing a drive chain that could be produced directly from coils by automatic machinery, mill engineers were working out a stronger, more rust resistant steel that would be applicable to the automatic equipment.

The present farm program has expanded mechanization, demanding greater tonnages of this special chain steel, of which Sharon is one of the leading producers.

***Specialists in STAINLESS, ALLOY, COLD ROLLED and COATED Strip Steels.**

SHARON STEEL CORPORATION

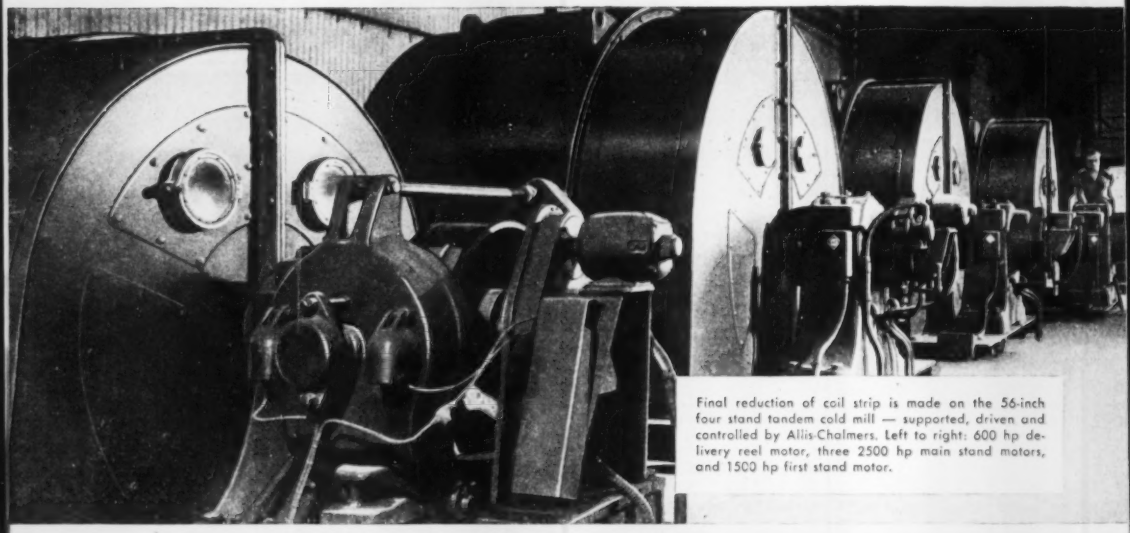
Sharon, Pennsylvania

DISTRICT SALES OFFICES: CHICAGO, ILL., CINCINNATI, O., CLEVELAND, O., DAYTON, O., DETROIT, MICH., INDIANAPOLIS, IND., MILWAUKEE, WIS., NEW YORK, N. Y., PHILADELPHIA, PENNA., ROCHESTER, N. Y., LOS ANGELES, CALIF., SAN FRANCISCO, CALIF., MONTREAL, QUE., TORONTO, ONT.

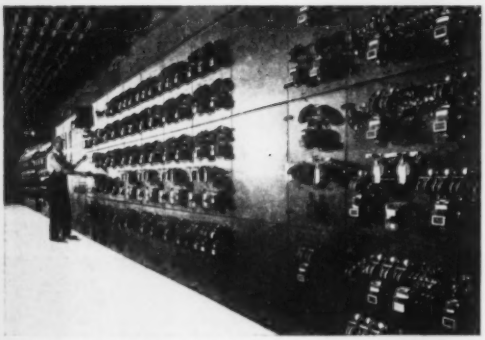
For information on Titanium Developments contact Mallory-Sharon Titanium Corp., Indianapolis 6

SHARONSTEEL

ALLIS-CHALMERS SPEEDS

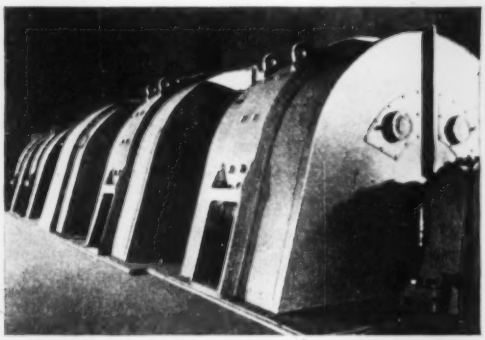


Final reduction of coil strip is made on the 56-inch four stand tandem cold mill — supported, driven and controlled by Allis-Chalmers. Left to right: 600 hp delivery reel motor, three 2500 hp main stand motors, and 1500 hp first stand motor.



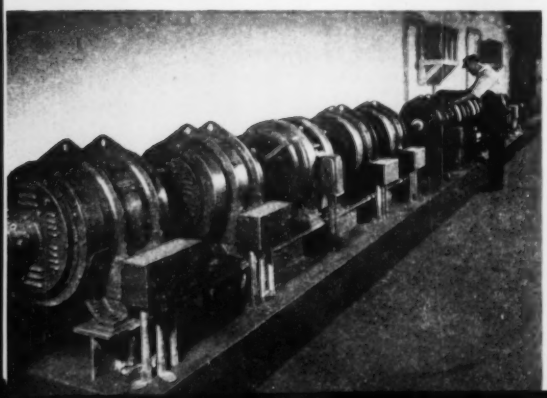
Variable voltage dc control board for 56-inch tandem cold mill. Allis-Chalmers supplied all controls and switchgear — as well as the main and auxiliary drives — for processing the steel from the hot mill to shipping.

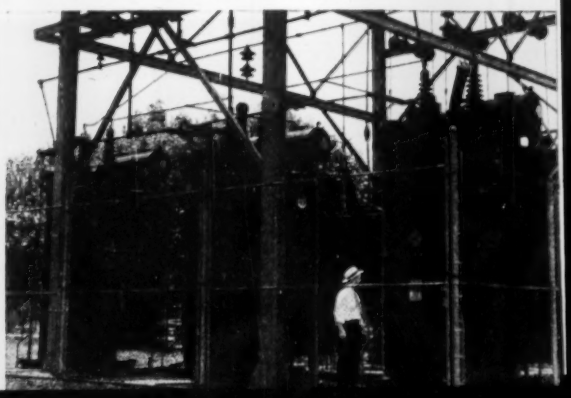
Regulex rotating amplifier exciter sets provide variable voltage dc control of the drive motors and M-G set. Wide use is made here of *Regulex* exciter sets to control tension, reel buildup and speed matching.



The individual generator system of support and control is employed on the cold reduction mill, which was first placed in operation in 1947. The Allis-Chalmers supporting 7-machine, 7750 kw M-G set is seen here.

These three Allis-Chalmers 4000 kva oil immersed, self-cooled transformers handle the incoming power for the cold mill. Transmission power at 69 kv is transformed to 6900 volts for the synchronous M-G set.





SINCE
GRANITE CITY STEEL
1878

STEEL ROLLING

AN AGGRESSIVE, UNAFRAID APPROACH to increased demand is typical of the Granite City Steel Company. Completing a $26,000,000 expansion only two years ago, and with a $6,000,000 program nearing completion, the company now has announced a further $50,000,000 expansion! Capacity — mostly in coils, sheets and tinplate — will then be well over a million tons a year.

Operations pictured were included in the recently completed expansion. They illustrate the wide range of equipment Allis-Chalmers has supplied the Granite City Steel Company and offers to the American steel industry in its expansion efforts.

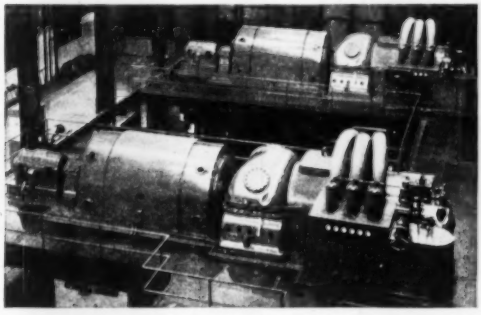
Complete electrical equipment — from the hot strip mill to shipping — was supplied by Allis-Chalmers! This broad, quality line of equipment has proved so satisfactory that the steel company has specified Allis-Chalmers substations and power transformers, as well as drives, controls and auxiliaries for the roughing and reversing blooming mills, for the *next* expansion program.

Constant growth has characterized this progressive midwestern company ever since its founding in 1878. During that time steel rolling at Granite City has gone from single stand, two high hand mills of under a ton per hour capacity to the modern four stand, four high tandem cold mill (left) of 45 tons per hour capacity.

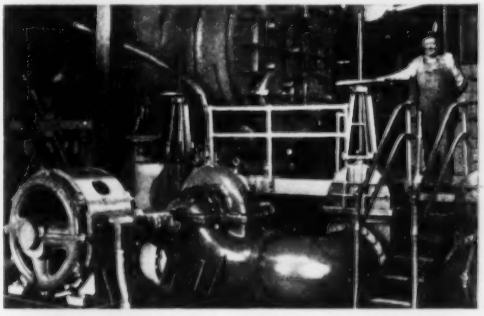
Strip is tempered (space not permitting illustration) on either a 48 or 56-inch temper mill . . . both of which are also Allis-Chalmers driven, supported and controlled. All electrical equipment for processing — including pickling, cleaning, tinning, and shearing — also is A-C supplied.

Your conversion or expansion program also can benefit from Allis-Chalmers wide experience in building and applying electrical equipment in the iron and steel industry. Integrated design and unit responsibility assure you of dependable performance. For more information, call the steel mill representative at your nearest A-C office or write to Allis-Chalmers, Milwaukee 1, Wisconsin.

A-3454



These two Allis-Chalmers 7500 kw condensing steam turbine generator units have been meeting the heavy power demand of the continuous hot strip mill at Granite City Steel Company for nearly 15 years.



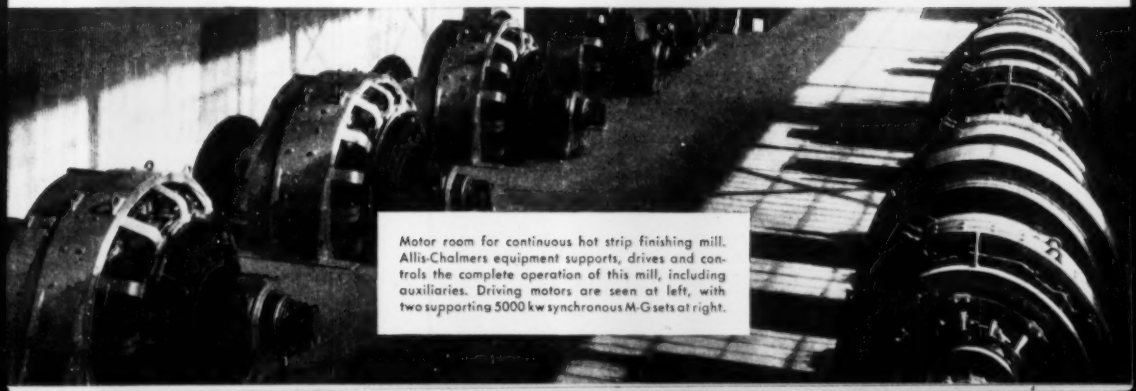
At left above are the 8000 sq. ft. surface condenser, 11,300 gpm circulating water pump, and 150 hp induction motor — all Allis-Chalmers — serving one of the two 7500 kw steam turbines for the hot mill.

Regulex is an Allis-Chalmers trademark.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

Power, Electrical, Processing Equipment for Iron and Steel



Motor room for continuous hot strip finishing mill. Allis-Chalmers equipment supports, drives and controls the complete operation of this mill, including auxiliaries. Driving motors are seen at left, with two supporting 5000 kw synchronous M-G sets at right.

KEYSTONE
MUSIC SPRING WIRE
Does the Trick!

Keystone Music Spring Wire has a smooth way of making production problems disappear for manufacturers of intricate springs and parts.

The structural soundness and uniformity of this ultra-quality wire is attained by careful selection of raw materials, slow and meticulous processing and constant examination from start to finish. Rigid final inspections include coiling, torsion and bend tests which further assure end products of the highest quality.

Scrap Is Vital!

COLLECT EVERY POUND OF SCRAP IN YOUR PLANT AND SELL IT TODAY

Iron and steel scrap, the vital ingredient in steel making, is in critically short supply. In order to keep America's steel industry producing at the highest rate in history . . . the "forgotten" or neglected scrap in your plant is urgently needed.

Search every corner of your plant for obsolete and discarded machinery, plates, sheets, gears, rails, scrap of every description. Sell it to your scrap dealer. More scrap turned IN . . . means more steel turned OUT to supply the tremendous demands of our domestic and defense objectives.

KEYSTONE
STEEL & WIRE CO.
SPECIAL ANALYSIS WIRE. SETTING NEW STANDARDS OF PERFORMANCE
PEORIA ILLINOIS

STEEL

EDITORIAL STAFF

Editor-in-Chief — E. L. SHANER
Editor — IRWIN H. SUCH
Managing Editor — WALTER J. CAMPBELL
Market Editor — WM. M. ROONEY
Engineering Editor — WALTER TOERGE
Steel Plant Editor — J. D. KNOX
Machine Tool Editor — GUY HUBBARD
Consulting Editor — ALLEN G. GRAY
Art Editor — DON S. CADOT

Associate Editors:
A. H. ALLEN, FRANK R. BRIGGS
VANCE BELL, JOHN S. MORGAN
EDWARD C. BIRKNER, EDWIN L. KARPICK

Assistant Editors:
SAMUEL W. BAKER, WILLIAM R. WOLPE
DOLORES K. MALLE, M. T. BORGERHOFF
ARTHUR W. ZIMMERMAN, L. J. SKUDERIN

Resident Editors:
Washington — E. C. KREUTZBERG
New York — B. K. PRICE, L. B. BROWNE
Pittsburgh — IAN HUEBEL
Detroit — H. C. TUTTLE
Chicago — E. F. ROSS
London, European Editor — VINCENT DELPORT

Editorial Correspondents:
Birmingham, R. W. Kincey; Buffalo, L. G. Feldmann; Cincinnati, Samuel S. Carr; St. Louis, Mac L. Hutchens; Youngstown, George R. Reiss; Los Angeles, Norman Lynn; San Francisco, Edwin Haverty; Seattle, R. C. Hill; Dallas, C. K. Cates; Toronto, F. S. Tobin; Birmingham, Eng., J. A. Horton; Paris, France, Leon Jaudoin; Liege, Belgium, Jacques Poulon; Dusseldorf, Germany, Herbert Gross.

BUSINESS STAFF

Business Manager — J. W. ZUBER

Advertising:
Service Manager — C. H. BAILEY
Production Manager — A. V. ANDERSON
New York — E. W. KREUTZBERG, K. A. ZOLLNER, CALVIN FISHER JR., K. W. HEWITT
Pittsburgh — S. H. JASPER, H. G. ROWLAND, J. C. SULLIVAN
Chicago — L. C. PRLOTT, W. L. POLAND
Cleveland — D. C. KIEFER, H. G. ROWLAND, C. A. TALLINGER
Los Angeles — F. J. FULLER

Circulation Department:
Manager — G. R. EBERSOLE
Readers' Service — E. L. FRANKE

Circulation Representatives:
H. R. DUNNE, D. G. HEWITT, C. A. PRICE, T. R. WARREN

Main Office:
Penton Building, Cleveland 13, Ohio
Main 1-8260

Branch Offices:
New York 17 — 60 East 42nd St., Murray Hill 2-2581
Chicago 11 — 520 North Michigan Ave., Whitehall 4-1234
Pittsburgh 19 — 2837 Koppers Bldg., Atlantic 1-3211
Detroit 2 — 6560 Cass Ave., Trinity 5-3024
Washington 4 — 1123 National Press Bldg., Executive 6849
Los Angeles 48 — 6262 Commodore Sloat Dr., Webster 1-6865
London 2, Caxton St., Westminster, S.W. 1

Published by
THE PENTON PUBLISHING COMPANY
Chairman — E. L. SHANER
President and Treasurer — G. O. HAYS
Vice Pres., Director of Adv. — R. C. JAENKE
Vice Pres. and Secretary — F. O. STEINEHACH
Assistant Treasurer — R. W. COLEMAN

Also publisher of
FOUNDRY • MACHINE DESIGN
NEW EQUIPMENT DIGEST

CCA NBP

Member, Controlled Circulation Audit Inc., National Association of Magazine Publishers, Society of Business Magazine Editors, and National Business Publications Inc.

WHERE WILL THEY ATTACK IN YOUR PLANT?

MACHINERY STORED OUTDOORS
Problem Corrosion
Answer Insul-Mastic Vinyl System

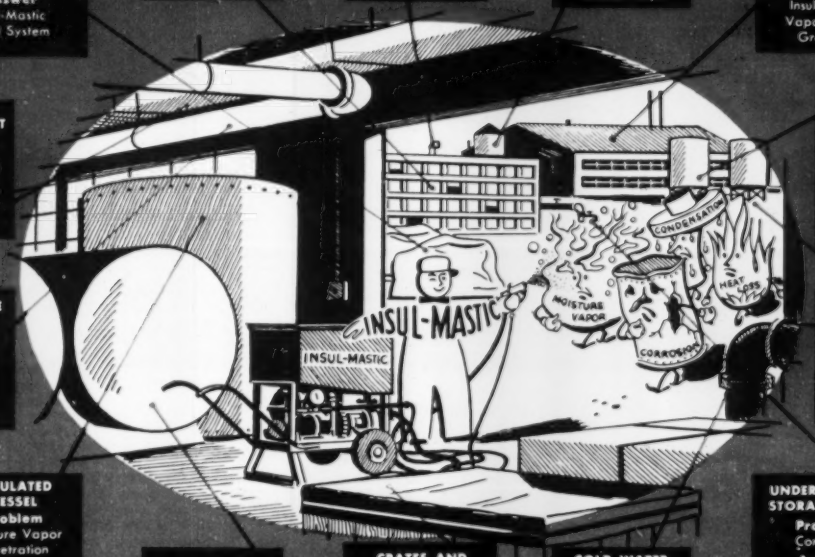
LEAKING WALLS
Problem Moisture
Answer Insul-Mastic Vaporseal & Granules

CORROSIVE VAPOR OUTLET
Problem Corrosion
Answer Insul-Mastic Vaporseal

WATER TANK
Problem Corrosion
Answer Outside—Insul-Mastic Vaporseal
Inside—Insul-Mastic Vinyl

LEAKING ROOF
Problem Moisture
Answer Insul-Mastic Vaporseal & Granules

WARM AIR DUCT
Problem Heat Loss
Answer Insul-Mastic Type "D"



MODERATE TEMPERATURE STORAGE TANK
Problem Heat Loss and Corrosion
Answer Insul-Mastic Type "D"

INSULATED PIPE
Problem Moisture Vapor Penetration
Answer Insul-Mastic Vaporseal

STRUCTURAL STEEL
Problem Corrosion
Answer Insul-Mastic Vaporseal

INSULATED VESSEL
Problem Moisture Vapor Penetration
Answer Insul-Mastic Vaporseal

ACID TANK
Problem Corrosion
Answer Insul-Mastic Vaporseal

CRATES AND CARTONS FOR OVERSEAS SHIPMENT
Problem Moisture and Salt Air
Answer Insul-Mastic Packaging Glues

COLD WATER INTAKE PIPE FOR BOILERS
Problem Condensation
Answer Insul-Mastic Type "D"

UNDERGROUND STORAGE TANK
Problem Corrosion
Answer Insul-Mastic Vaporseal

PROTECT YOUR EQUIPMENT WITH
INSUL-MASTIC
COATINGS OF UNEQUALED QUALITY

You can't select a heavy coating of better quality than Insul-Mastic. Its ingredients were specially chosen for their stubborn resistance to acids, alkalis, weather and wear. Insul-Mastic is homogenized for smooth spraying without blobs or pinholes. *Write today for our catalog.*

Think first of the coatings that last!

Insul-Mastic Corporation
OF AMERICA
1166 OLIVER BUILDING · PITTSBURGH 22, PA.
Representatives in Principal Cities

WHEELABRATOR
airless blast cleaning
IDEAS
FOR SPEEDING PRODUCTION

The high-speed operation of the Wheelabrator offers many possibilities for meeting expanded production schedules, and at the same time using even less manpower. Users have found that this versatile cleaning, finishing and surface preparation machine does the job in minutes instead of in hours. For proof, see the case histories below:

SAVES 21 HOURS DAILY PRIOR TO RUBBERIZING

To prepare the surfaces of metal parts for rubberizing, Reeves Rubber, Inc., replaced costly, time-consuming air blasting with a Wheelabrator. Results: rubber adheres tenaciously to the Wheelabrator surface, preparation time slashed 21 hours daily; cost saving of from 50% to 82%.

CUTS CLEANING TIME 86% FOR WELDMENTS

The B. H. Aircraft Co. is currently using the Wheelabrator for cleaning prior to the spot welding and/or silver brazing of pipe assemblies. The average time for cleaning is about 14% of the time for air blasting.

The WHEELABRATOR Unit

WHEELABRATOR HAS UNLIMITED APPLICATIONS

For example: Reducing porosity of die castings; Deflashing plastic molded parts; Surface preparation for galvanizing, plating, enameling, glass coating, bonding; Improving deep drawing operations; Etching steel mill rolls; Removing mica from molded rubber; Cleaning castings and forgings.

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

American
WHEELABRATOR & EQUIPMENT CORP.
509 S. Byrkit St., Mishawaka 5, Indiana

LETTERS
TO THE EDITORS

No Charge for Steel

STEEL states in Mirrors of Motordom (Oct. 1, p. 49): "Auto builders are working to get foreign steel, copper and aluminum because whatever material they can bring in is not chargeable against CMP allocations." Is that correct?

A. R. Rowley, purchasing agent
Weber-Knapp Co.
Jamestown, N. Y.

• *Correct for steel; incorrect for copper and aluminum. Direction 4 to CMP Regulation 1, as amended, permits consumers to use imported steel to manufacture more products than quantity shown on their authorized production schedules.*

Order More Orchids

I appreciate the favorable comments and prominent position accorded the American Standard Association's "Post Hole" book in STEEL, Sept. 24. However, I am considerably embarrased to receive the entire credit for the book's existence. It was conceived and written by R. C. Alberts and all I did was translate it into visual form.

Mr. Alberts and I serve on the staff of Ketchum, MacLeod & Grove. *The Strange Case of the Seven-Sided Post Hole* is one aspect of our public relations service for American Standards Association.

Thanks for my orchid.

Tom Ross, art director
Ketchum, MacLeod & Grove Inc.
Pittsburgh

A Capable Substitute

Our engineering department is very much interested in receiving more detail on the white brass plating process STEEL reported in Mirrors of Motordom, Aug. 6, p. 57. Can you tell us whom to contact?

J. Andrew Ulrich
Pitney-Bowes Inc.
Stamford, Conn.

• *Contact: Plating Division, E. I. du Pont de Nemours & Co., Wilmington, Del.*

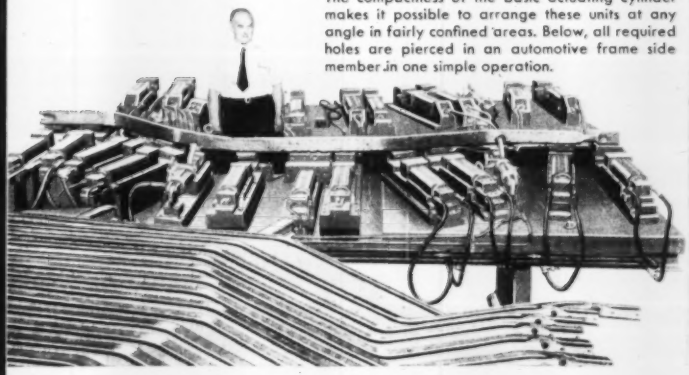
How Much Limestone?

Can STEEL supply information on 1950-51 consumption of limestone in the manufacture of iron and steel?

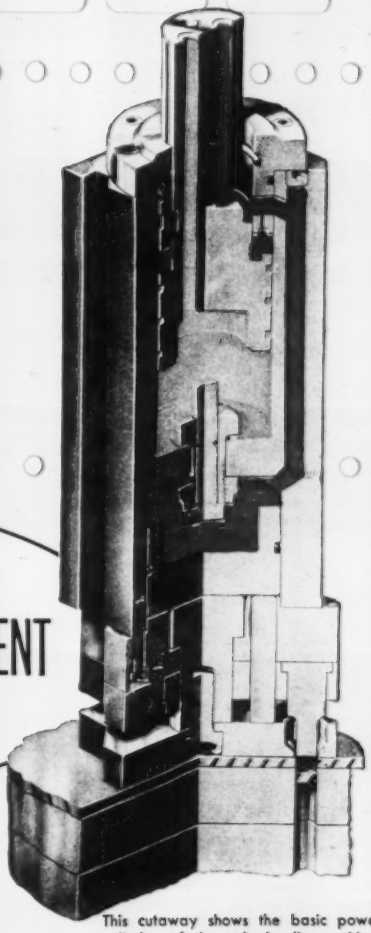
Alden Dun Perley
West Carrollton, O.

• *Iron and steel industry used between 34 and 35 million tons of limestone in 1950; consumption this year will be around 40 million tons. The 1950 figures break down to about 5.5 million tons for fleves in steelmaking furnaces and 28.5 million tons used in blast furnaces.*

NOW- GET COSTS OUT OF THE HOLES!



The compactness of the basic actuating cylinder makes it possible to arrange these units at any angle in fairly confined areas. Below, all required holes are pierced in an automotive frame side member in one simple operation.



This cutaway shows the basic power cylinder of these hydraulic machines after the hole is pierced and stripping is completed. Stripping and blankholding are entirely automatic, requiring no springs or additional valves, thus simplifying construction.

DANLY

Presents a Complete Line of

HYDRAULIC METALWORKING EQUIPMENT

With Built-in Blankholding and Stripping Action

Save manhours, floor space and equipment. Built under Mueller Patents, these machines provide a means to pierce holes, extrude holes for rivets, trim or rivet at any angle. All operations can be done on irregularly shaped parts and in fairly confined areas. Built-in stripping and blankholding action eliminates springs, extra valves, or other such devices, resulting in greater flexibility of arrangement.

Smooth hydraulic action and extra rigidity inherent in this construction makes it possible to pierce holes smaller in diameter than the thickness of the metal economically—or even to pierce holes in heat treated high carbon steel.

Danly engineers will design the equipment from your piecepart drawings. Danly proposals will include holding fixtures and complete tooling if desired. Phone or write for additional information today.

DANLY MACHINE SPECIALTIES, INC.
2100 South Laramie Avenue
Chicago 50, Illinois

Send for this Free Bulletin today

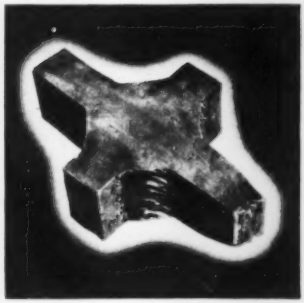
DANLY

U·S·S RESEARCH IN ACTION . . . FOR YOU

U·S·S Research Division Develops

Look at these test results:

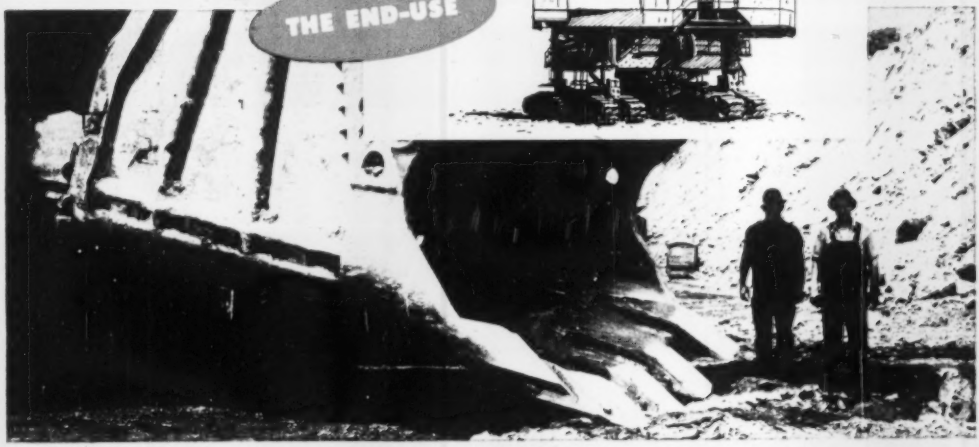
THE STEEL



90° BEND AT 98 BELOW! This sample, flame-cut from 1" CARILLOY T-1 plate, was chilled to —98 F., and then bent to a full 90° angle. Even though the raw, flame-cut edge made up the outer radius of the bend, there was no sign of failure!

100% WELD STRENGTH—Tensile tests on T-Steel specimens like these were made to determine the strength of the welds. These welds develop the full strength of the parent metal. Note that breaks occur outside the heat-affected zone. No special pre-heating or post-heating treatments are required beyond those used with ordinary structural steels.

THE END-USE



Remarkable New Structural Steel

TO MEET SEVERE SERVICE REQUIREMENTS

● The answers turned up by many U·S·S research projects have immediate practical use. They enable us to produce better steels and solve customers' baffling problems.

Typical was the recent development of CARILLOY T-1 steel—one of the most interesting projects ever undertaken by the United States Steel Research Division.

The actual problem was defined by manufacturers of heavy-duty construction equipment. Superstrong steels were needed; at the same time they had to withstand tremendous shock loads, abrasion and very low temperatures. Few of the alloy steels then known could be welded in the field because of the required pre-heating and post-heating. For this reason, the cost of down-time for—say a 35 cu. yd. stripping shovel—is enormous. When an important part breaks down, the whole operation grinds to a halt. The entire tipple and pit crew—together with all their expensive equipment—may be idle for days waiting for a part to be repaired in the shop.

To meet this situation, we set out to create one of the most unusual and promising steels ever developed . . . a steel so strong that, per pound of tensile strength, it is the *cheapest* weldable steel that money can buy.

Metallurgical and Research Divisions collaborated on this job. The Metallurgical Division defined accurately the many requirements—strength, weldability, toughness, forming characteristics.

Then the Research Division took over. With a background of knowledge of many alloying materials and their effect on the end product, dozens of laboratory heats were made and tested with great care. The final composition gradually evolved: a steel alloyed with manganese, nickel, chromium, molybdenum, vanadium and boron. A tempered martensitic microstructure was obtained through heat treatment.

Since the main emphasis was on toughness under all conditions, Charpy (keyhole) impact tests were carried out over a wide range of temperatures. Extensive welding, bending, tensile and compression tests were also made. Many fabricating techniques were tried to be sure the steel could be easily worked.

Now the results are in; and they look good. The transition temperature of CARILLOY T-1 is so low that it will remain ductile at any climatic temperature on earth—even *after* welding or gas-cutting. Welds do not require special pre-heating or post-heating, yet they develop the full strength of the base metal. With the raw, flame-cut edge outermost, a 1″ x 1″ specimen was chilled to —98°F., then bent to a full 90° without a sign of cracking. This despite the fact that $\frac{1}{4}$″ to 2″ plates of CARILLOY T-1 have a minimum tensile strength of *115,000 psi.*

CARILLOY T-1 is now being used in the dipper sticks and scoops of the biggest power shovels in the world. Preliminary reports show that it should far outlast conventional steel. Repairs can be made easily in the field.

• • •

The great majority of your steel problems can be cleared up by our service metallurgists with their rich background of experience. When existing data are inadequate it is good to know that a seasoned group of steel research men is ready to dig out the answers.

United States Steel Company has large research and development laboratories in its mills and in Pittsburgh. Long-range research is carried out at Kearny, N. J. Also, U. S. Steel Company sponsors scientific studies in many universities and research institutions. The fruits of this research can be found in the low cost and ever-increasing utility of our steel products.

UNITED STATES STEEL COMPANY, PITTSBURGH

COLUMBIA STEEL COMPANY, SAN FRANCISCO · TENNESSEE COAL, IRON & RAILROAD COMPANY, FAIRFIELD, ALA.

UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST · UNITED STATES STEEL EXPORT COMPANY, NEW YORK

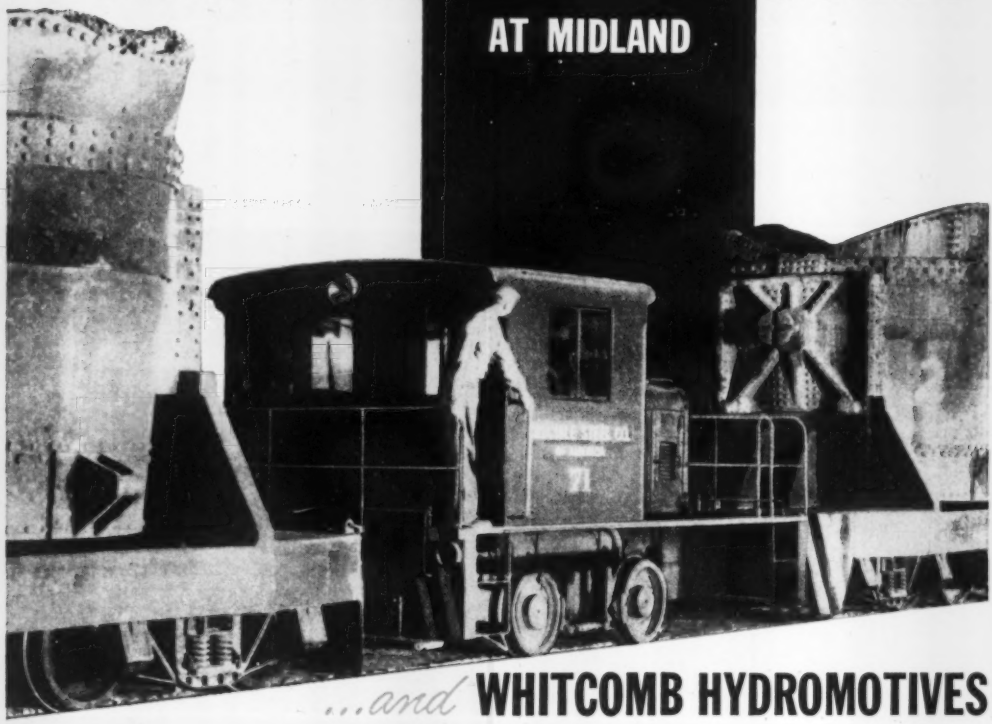
Carilloy Steels

ELECTRIC FURNACE OR OPEN HEARTH • COMPLETE PRODUCTION FACILITIES IN CHICAGO AND PITTSBURGH

T-1350

UNITED STATES STEEL

CRUCIBLE SMASHES ALL PRODUCTION RECORDS AT MIDLAND



...and WHITCOMB HYDROMOTIVES helped make it possible!

Crucible had a tough materials-handling problem in its open hearth and conditioning departments at Midland. When a crane ran a load the length of the building, other cranes were stacked up against the ends. Vital time was lost . . . tempers were frayed.

Then two Whitcombs were purchased to handle these hauls . . . to feed the cranes stationed along the floor. Stoppages were cut to a minimum, handling time reduced . . . *an all-time production record set.*

Because Whitcomb Locomotives operate so easily, control so easily, give the operators extra visibility in every direction, they are a favorite choice of astute managers interested in solving materials-handling problems. A favorite, too, because of the surprisingly low maintenance and fuel costs . . . as proved at Midland and many other plants.

Interested in speeding up your haulage operations in switchyards or in the plant? If you are, we'd like an opportunity to show you what Whitcomb Locomotives have done for others . . . what they can do for you.

THE WHITCOMB LOCOMOTIVE COMPANY

Rochelle, Illinois

Subsidiary of Baldwin-Lima-Hamilton Corporation

BALDWIN BLH LIMA-HAMILTON

- Diesel-hydraulic Locomotives from 10 to 40 tons
- Diesel-electric Locomotives from 20 to 95 tons
- Diesel-mechanical Locomotives in 5 and 8 tons

WHEN YOU SELECT

WHITCOMB DIESEL LOCOMOTIVES

YOU GET RELIABILITY

Production Pointers from GISHOLT

TIME-SAVING IDEAS

Why Gisholt's Recommendations Are Unbiased. In helping you solve your turning problems, Gisholt engineers have no reason to favor one type of machine over another except on the basis of its ability to best serve your needs. For Gisholt manufactures both manually operated turret lathes and automatic lathes.

FASTERMATIC KEEPS 8 CUTTING TOOLS BUSY TO TURN OUT FORGED PARTS IN A HURRY

Job Requires Rough and Finish Machining on All Surfaces

The trick here was to turn these steel forgings into top slips for oil well equipment in the fastest, lowest cost way. The nature of the cuts—both straight and taper bores . . . facing . . . inside deep grooving . . . and two chamfers—indicated that the 2F Fastermatic Automatic Turret Lathe was a "natural" for the job.

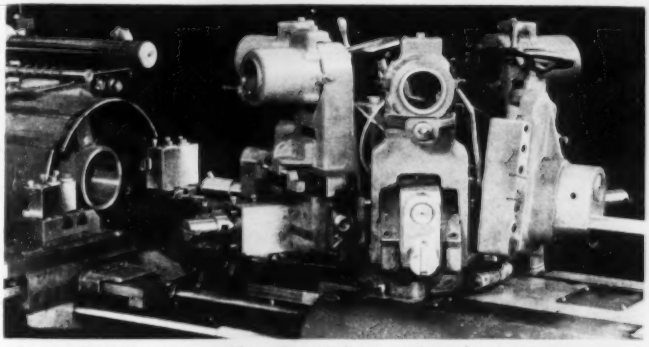
All this work, both rough and finish cutting, calls for all six hexagon turret faces, and the individual front and rear cross slides . . . 8 tool approaches to the work.

The operation starts with rough boring of the ID from first turret station. At the same time, the front cross slide rough faces. Next, the rest of the ID is rough tapered by a slide tool mounted on the second turret station and which is guided by a cam on the rear cross slide.

Maximum Use of Standard Tools

Indexing to the third turret station, the straight bore is finished, while finish facing is handled by the rear cross slide. Rough grooving in the straight bore follows. A standard grooving tool on turret station four reaches in for this deep operation. This tool is actuated by a stop on the headstock which causes it to feed to depth while the turret feeds forward.

At station five, tools similar to station two finish the taper bore and chamfer the inner edge. Winding up the job, a grooving tool at station six (as at station four) finish grooves and makes a small bevel in the inner groove.



Tooled up to turn out 5" top slips, this Fastermatic keeps 8 tool stations working at top efficiency.

At right the rough forging. Center view shows taper end after machining. At left is the same part reversed.

The whole job takes only 5.5 minutes, floor-to-floor—with the machine's automatic cycle allowing the operator to handle other work on a second Fastermatic. It's another example of how the flexible standard tooling and automatic speed and feed changes make the Fastermatic ideal for high efficiency output where a variety of diameters and straight and angular surfaces are machined.

With all tool stations working, the Fastermatic performs all rough and finish facing, straight and angular boring; and grooving operations on these parts in a single chucking—fast.

FOR MORE PRODUCTION FROM

A CLEAR-CUT CASE FOR RUGGED DESIGN

New Saddle Type Turret Lathe Cuts Time ⅔

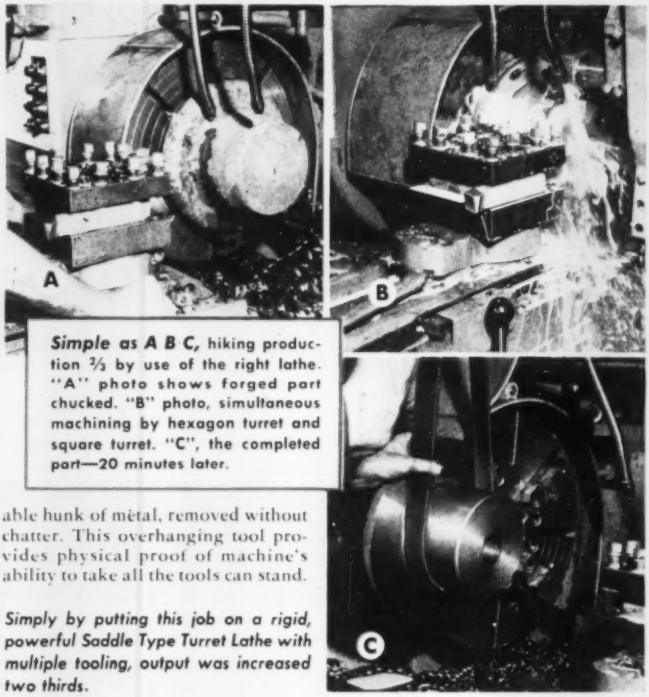
If you want convincing evidence of what rigidity and pulling power can do to costs, this is it.

This manufacturer formerly machined these companion flanges on an older type machine. Parts are mild steel hammered forgings, which measure 7½" on the body and 12½" on the flange. Production dragged along at one part per hour. The other lathe couldn't take over one cut at a time.

Now, with the job on a Gisholt 3L Saddle Type machine, *three* parts are finished in the same time. The big difference lies in sheer power and rigidity.

The part is chucked on the large OD. Tools in a multiple turning head simultaneously rough the OD and ID of the body. Finishing is handled in the same manner from the second turret station. Tools on the quick indexing square turret do the facing, chamfering and radius at the same time the hexagon turret is working.

On the turning cut a 1¼" carbide tool bit removes up to 1⅛" on the side with a .019" feed. That's a sizable hunk of metal, removed without chatter. This overhanging tool provides physical proof of machine's ability to take all the tools can stand.



Simple as A B C, **hiking production ⅔ by use of the right lathe. "A" photo shows forged part chucked. "B" photo, simultaneous machining by hexagon turret and square turret. "C", the completed part—20 minutes later.**

Simply by putting this job on a rigid, powerful Saddle Type Turret Lathe with multiple tooling, output was increased two thirds.

THIS KIND OF PLANNING PAYS OFF

With Proper Tooling Ram Type Lathe Handles 6 Different Parts for One Assembly

Careful planning pays off on any job, of course. But here's an outstanding example of it—for machining six different parts of the same assembly—where precision is required but total quantity doesn't warrant a high production setup.

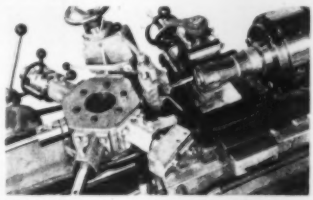
Tooling is smartly planned for the Gisholt No. 4 Ram Type Turret Lathe so there is fast changeover for handling all the pieces. The air chuck with special fixtures is quickly and easily adapted for both internal and external holding.

External work and facing are done by tools on the quick indexing square turret on the cross slide carriage. Tools for the hexagon turret, which do all internal work, are shown in the photo. These handle precision machining on all six of the parts.

The internal machining of these six different parts for one assembly is all handled by this one group of tools (right) on the hexagon turret.

Yes, well planned tooling can solve production problems. Good reason why you should check with Gisholt for the tools that can help cut your machining time and costs. Ask about them.

The machining of six different parts is planned around one set of tools. This user is time and money ahead.



One of the parts set up in the No. 4 Ram Type Turret Lathe.

GISHOLT

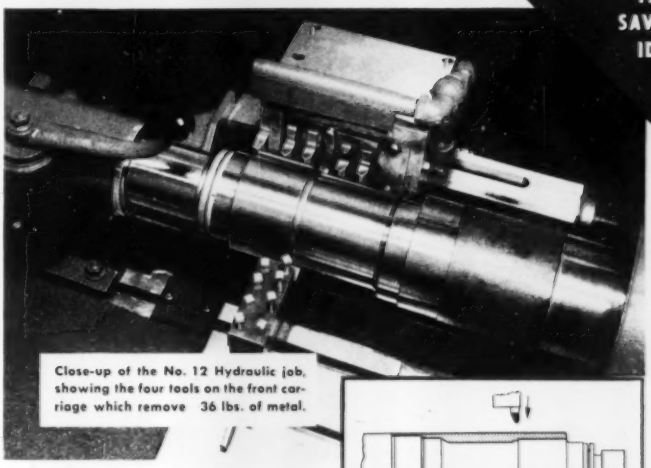
PARTS GET QUICK TRIMMING *(36 LBS. OF METAL)* BY NO. 12 HYDRAULIC

4 Tools Team Up to Make Deep Cut on Same Surface

Here's a way to hog off metal with real finesse—the way this No. 12 Hydraulic Automatic Lathe brings parts down 36 lbs. to size. There is too much depth of stock on these 7½" N.E. 8640 cylinders for one tool to remove in a single pass (shaded area of drawing), so the job is divided among four tools.

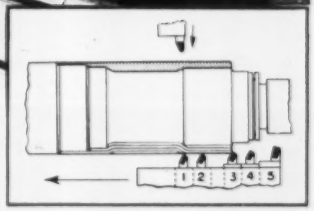
Tools are mounted in individual cam controlled sliding tool blocks on the longitudinally feeding front carriage. As each tool reaches the position shown by the first tool (see drawing), it is cammed inward to follow the required contour. Since the tools are successive, they follow the depth lines shown in the drawing. The fifth tool finishes the large OD at the right end, and the single tool on the rear carriage forms the right radius.

With work being done at 265 f.p.m. and .015 feed, the floor-to-floor time for removing 36 lbs. of metal in this operation is eight minutes flat. Because tool load is moderate by this successive cutting arrangement, tool life is excellent. Also, the same operator handles another No. 12 Hydraulic which does the other end of the cylinders. Write for the new No. 12 Catalog. It shows 28 different examples of jobs handled on this machine.



Close-up of the No. 12 Hydraulic job, showing the four tools on the front carriage which remove 36 lbs. of metal.

In four successive contour cuts, with cam-controlled slides, this No. 12 Hydraulic brings cylinders down to size in a single automatic operation.



The shaded area at top shows total metal removed by successive cuts from tools 1, 2, 3, 4 at bottom. Fifth tool finishes large OD at right of cylinder.

FRONT, BACK AND INSIDE OF HEAVY PIPE FLANGES MACHINED AT SAME TIME

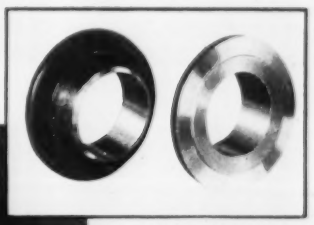
Entire Job Done in Single Chucking

Note this efficient setup for machining heavy duty steel pipe flanges on a Simplimatic Automatic Lathe. See how it's planned for simultaneous machining of all surfaces—front, back and inside?

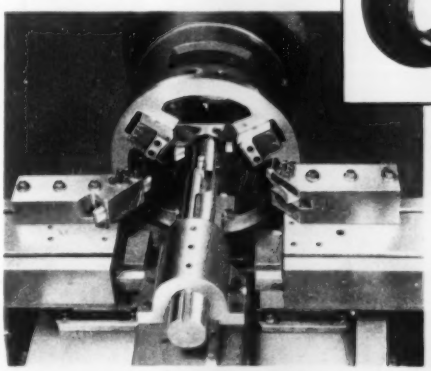
The part is held on the hub with a special fixture. Piloted tools on the center slide rough and finish bore and chamfer. The two back tools, which are operated through the spindle, face and chamfer the neck. Tools on the front and rear slides rough and finish the two flange steps.

All cuts are simultaneous—with the 8" pipe flanges being finished in one operation at a rate of one part every 3.7 minutes, floor-to-floor. Another good example of the Simplimatic's ability to cut time and costs on all types of jobs.

This manufacturer profits from the adaptability of the Simplimatic by rough and finish machining all surfaces of these pipe flanges in one operation.



Finished 8" pipe flange.



This tool planning you see here enables this manufacturer to machine both ends and inside of flanges at same time.

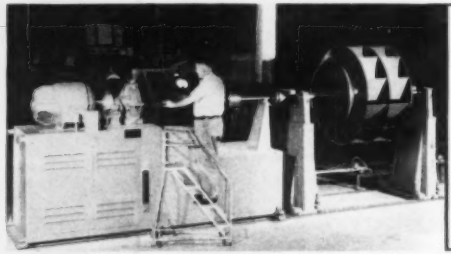
TIME-SAVING IDEAS

LARGE BLOWERS STAY QUIET, LAST LONGER THROUGH PRECISION BALANCING

Unbalance Located and Measured; Correction and Re-check Made on Balancer

There's mighty slim chance for noise, vibration and excessive bearing wear in the large blowers which The Trane Company, La Crosse, Wisconsin, fabricates for its air-conditioning systems. Precision balancing on Gisholt Balancing Machines does away with these hazards.

The large blowers, in sizes up to 60" and weighing up to 3 tons, are balanced on the Type 6UH machine shown here. Balancing is done right on their installation shafts—with the work supports quickly adjustable to each shaft length by movement along the track set in the floor.



This Gisholt Type 6UH Balancer locates and measures unbalance in various size blowers.

In operation, each unit of unbalance shown on the amount meter equals 0.1 oz. of correction weight. There's no computing necessary on the part of the operator . . . he merely reads the amount of required correction. When the amount and location of unbalance are determined, steel correction washers are welded at the indicated points and the part is checked for accuracy of balance.

This entire blower balancing job is handled in one operation and by one machine in fast time.

Design for Balancing Covered in Gisholt Balancing School

How to design rotating parts for fast, economical balancing is just one of the broad range of subjects covered fully in the Gisholt Balancing School. New classes start on November 5th and December 3rd. Write for complete information.

DYNETRIC BALANCERS

IT'S A BIG ADVANTAGE FOR THESE LITTLE CRANKSHAFTS

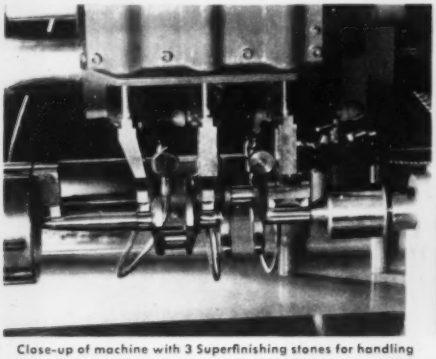
Two Superfinishers Quickly Handle All Bearing Surfaces

Because these outboard motor crankshafts seem peanut size compared to the others you know, you may think Superfinish is unnecessary. But, this manufacturer knows it's just as vital for better performance and longer life as for big-brother crankshafts in automotive and locomotive engines.

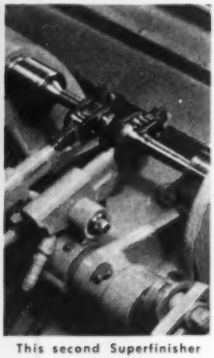
The r.p.m.'s of these little two-throw crankshafts are very high, and the bearing loads are severe. To Superfinish both the crankpin bearings and main bearings, two Superfinishers are used. The benefits are many—removal of grinding chatter marks . . . simplified grinding and lower grinding wheel costs . . . improved geometry . . . and simplified assembly because the resultant "base metal" requires no break-in tolerance.

What does Superfinishing add to production time and costs? Not a penny . . . there are 25 hours per thousand crankshafts for grinding time and the same for Superfinishing. That's actually a 35% improvement over the former rough and finish grinding time. And the job is far better, too.

Your complimentary copy of the booklet, *Wear and Surface Finish*, will make you an expert on the subject of Superfinish. Write for it.



Close-up of machine with 3 Superfinishing stones for handling crankshaft bearing surfaces.



This second Superfinisher does the crankpin bearings.

Superfinish pays big dividends on these little crankshafts by actually cutting grinding time as well as insuring better fits, longer life.

The Gisholt Round Table represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

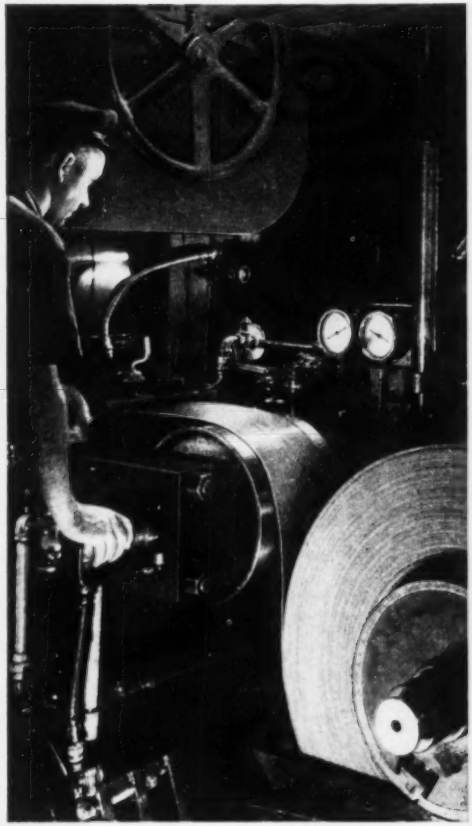
No. 1051
577

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin

A general catalog on machines listed below is available on request.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

SPRING STEEL



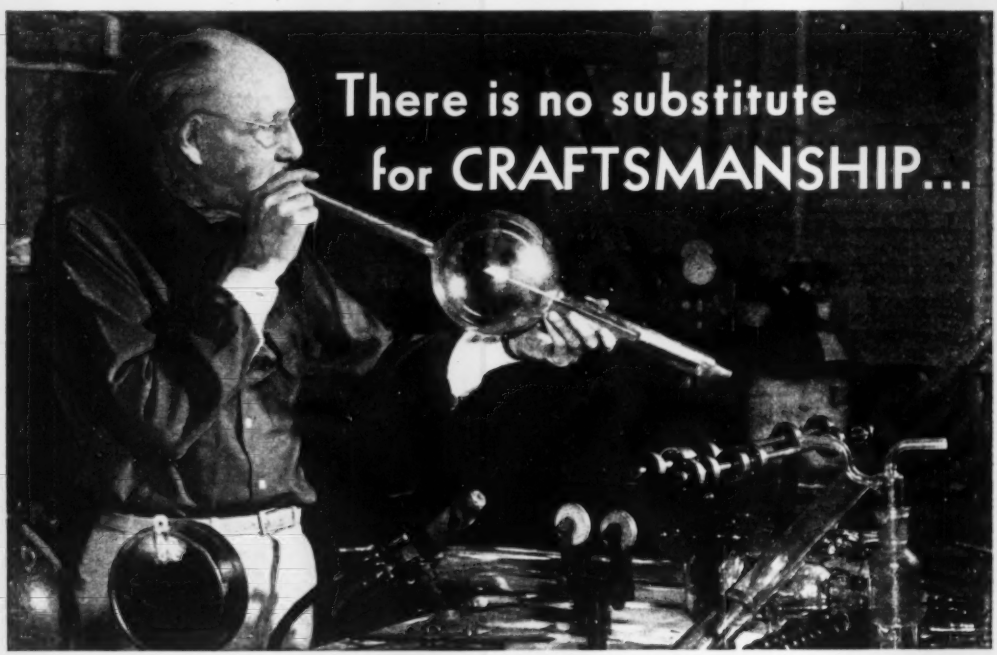
Roebling Cold Rolled Spring Steel brings fewer machine stoppages . . . fewer rejects

YOU SAVE MONEY with Roebling Cold Rolled Spring Steel because it's of absolutely uniform quality. Every inch is just like every other inch, dimensionally and in physical properties. Service records show that it cuts down preparation time . . . gives you a better product and better production. And Roebling Cold Rolled is made annealed, hard rolled untempered; scaleless tempered; tempered and polished; tempered, polished and strawed; and tempered, polished and blued.

Large quantities of Roebling's specialty wires – flat, round and shaped – are required today in the national rearmament program. Roebling, however, is one of America's largest manufacturers of specialty wires, and we shall always do everything possible to meet your requirements. John A. Roebling's Sons Company, Trenton 2, New Jersey.

ROEBLING

Atlanta, 934 Avon Ave ★ ***Boston,*** 51 Sleeper St ★ ***Chicago,*** 5525 W. Roosevelt Rd ★ ***Cincinnati,*** 3253 Fredonia Ave ★ ***Cleveland,*** 701 St. Clair Ave, N.E. ★ ***Denver,*** 4801 Jackson St ★ ***Detroit,*** 915 Fisher Building ★ ***Houston,*** 6216 Navigation Blvd ★ ***Los Angeles,*** 216 S. Alameda St ★ ***New York,*** 19 Rector St ★ ***Odessa, Texas,*** 1920 E. 2nd St ★ ***Philadelphia,*** 230 Vine St ★ ***San Francisco,*** 1740 17th St ★ ***Seattle,*** 900 1st Ave, S. ★ ***Tulsa,*** 321 N. Cheyenne St ★ Export Sales Office, ***Trenton, N. J.***



Flat Tempered and Untempered Wire in .50 to 1.25 Carbon Range.

Flat Cold-rolled Strip 6" and Narrower, Bright, Galvanized, Tinned and Cadmium Finish.

Round Untempered Low and High Carbon Spring Wires.

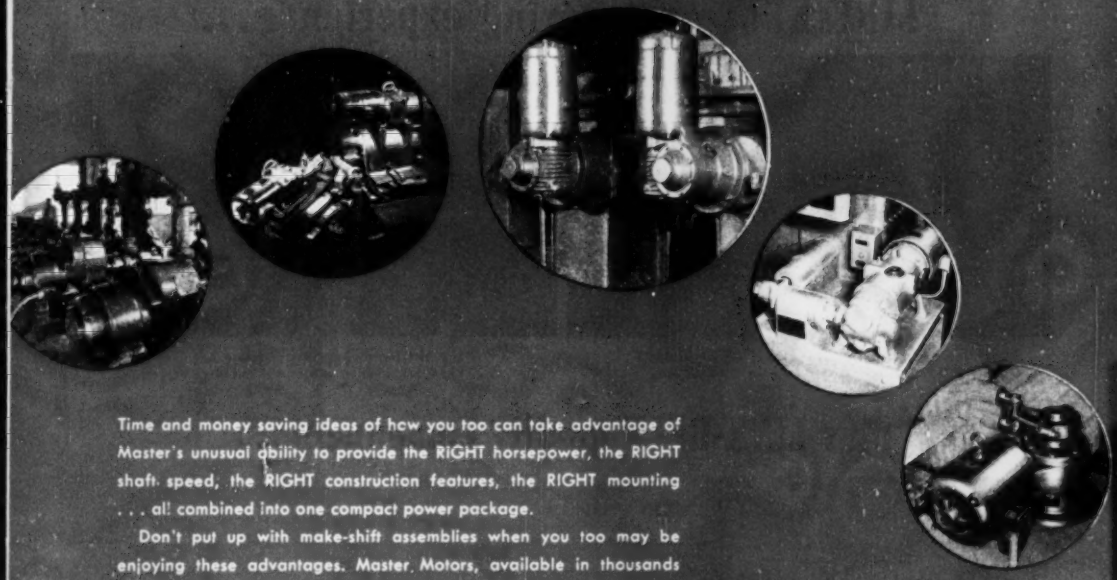
Even with the most modern and accurate controls, Washburn Craftsmen still have the "feel" of when a product is right for its specific use.

WASHBURN'S Uniform Quality and Precision Standards are the result of over fifty years experience meeting exacting requirements that help insure the quality of our customers' products.

WASHBURN WIRE COMPANY, NEW YORK CITY

WASHBURN

CLEAN, UNIFORM BILLETS - STRIP - RECTANGULAR, ROUND, FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES



Time and money saving ideas of how you too can take advantage of Master's unusual ability to provide the RIGHT horsepower, the RIGHT shaft speed, the RIGHT construction features, the RIGHT mounting . . . all combined into one compact power package.

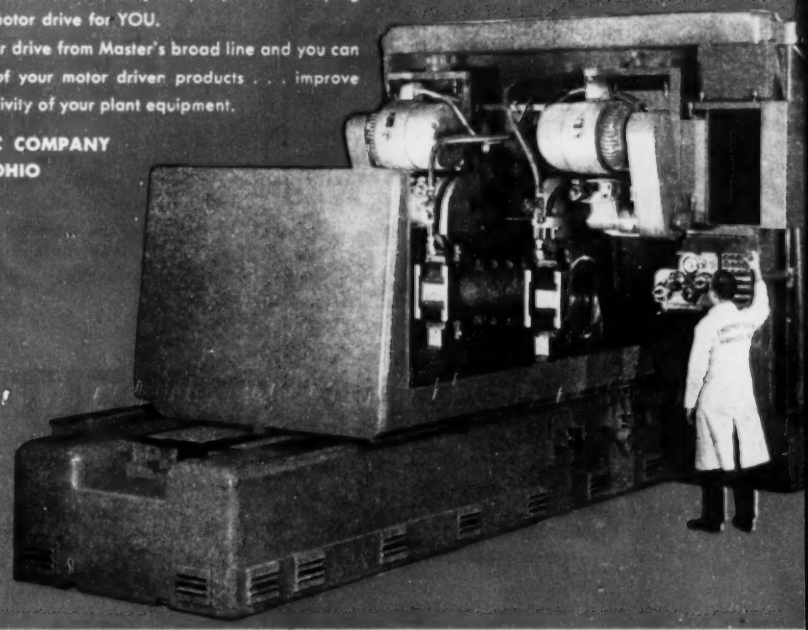
Don't put up with make-shift assemblies when you too may be enjoying these advantages. Master Motors, available in thousands and thousands of types and ratings (up to 150 HP) give you a selection you can get nowhere else.

Open, enclosed, splash-proof, fan-cooled, explosion-proof . . . horizontal or vertical . . . for all phases, voltages and frequencies . . . in single speed, multi-speed and variable speed types . . . with or without flanges or other special features . . . with 5 types of gear reduction up to 432 to 1 ratio . . . with electric brakes . . . with mechanical variable speed units . . . and for every type of mounting . . . Master has them all and so can be completely impartial in helping you select the one best motor drive for YOU.

this may give you ideas

Select the RIGHT power drive from Master's broad line and you can increase the saleability of your motor driven products . . . improve the economy and productivity of your plant equipment.

THE MASTER ELECTRIC COMPANY
DAYTON 1, OHIO

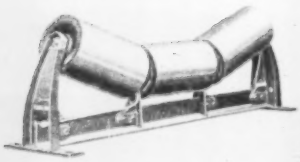


LINK-BELT engineering experience...

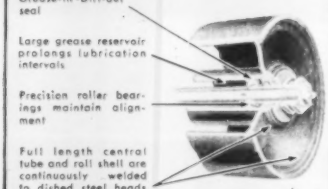
Link-Belt Belt Conveyor (part of cover removed) handling coke breeze for blast furnace.

Link-Belt Traveling Stacker and Yard Belt Conveyor for handling coal in and out of storage

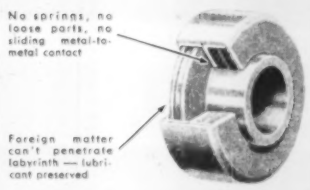
plus LINK-BELT quality components...



Standard for industry—L-B "100" Idler


Grease-in-Dirt-out seal
Large grease reservoir prolongs lubrication intervals
Precision roller bearings maintain alignment
Full length central tube and roll shell are continuously welded to dished steel heads for uniform, perfectly balanced strength

Less lubrication and adjustment


No springs, no loose parts, no sliding metal-to-metal contact
Foreign matter can't penetrate labyrinth — lubricant preserved

Grease-in-Dirt-out Seal

add up to your best bet in BELT CONVEYORS

LINK-BELT Belt Conveyors provide dependable, efficient travel for many different materials.

Get the finest in belt conveyor equipment in your plant. It can be as simple as calling in a Link-Belt engineer while you're still in the planning stage.

Thousands agree Link-Belt builds the finest belt conveyors on the market today. More, it has the most complete line of components—all types and sizes—idlers, take-ups, pulleys, trippers, bearings and power transmission drives. Plus all related equipment—other types of conveyors, feeders, elevators, car dumpers and shakers, weigh larries.

Equally important, Link-Belt Belt Conveyor engineers can draw on the broadest material handling experience in industry. They'll work with you and your consultants—help you come up with the right system for your requirements.

Call or write the Link-Belt branch office nearest you for the services of a belt conveyor expert.

LINK-BELT

BELT CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in Principal Cities. 12.048-A

2 parts now 1

KEPS

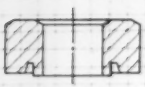
Trade Mark

THE AMAZING NEW PRE-ASSEMBLED NUT AND SHAKEPROOF* LOCK WASHER!

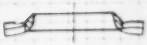
Build For KEEPS With KEPS!

- **faster**—nut and lock washer are handled as a single unit
- **free spinning**—easy to drive!
- **every nut locked tight**—the lock washer can't drop

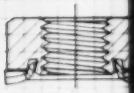
HERE'S HOW...



A precision formed nut—



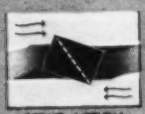
—and a specially designed SHAKEPROOF Lock Washer—



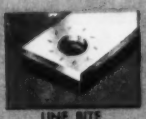
are pre-assembled the lock washer is free to rotate but can't drop off!

FEATURING FAMOUS SHAKEPROOF TAPERED-TWISTED LOCKING TEETH with exclusive three-way locking action for positive resistance to vibration loosening.

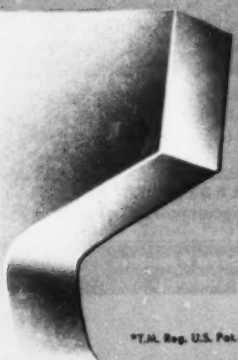
SPRING TENSION



STRUT ACTION



LINE BITE



*T.M. Reg. U.S. Pat. Off.

SEND FOR YOUR FREE COPY OF THE **KEPS DATA BOOK** TODAY...

check the time and cost savings that you can achieve with KEPS on your assembly line!

SHAKEPROOF inc.

"Fastening Headquarters"

Trade Mark

A DIVISION OF ILLINOIS TOOL WORKS

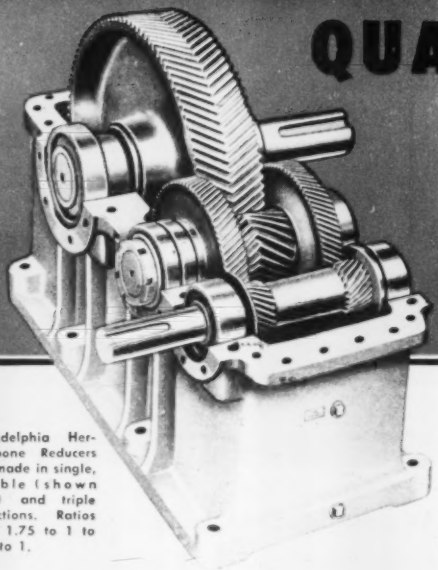
2501 North Keeler Avenue • Chicago 39, Illinois

In Canada: Canada Illinois Tools Ltd., Toronto, Ontario

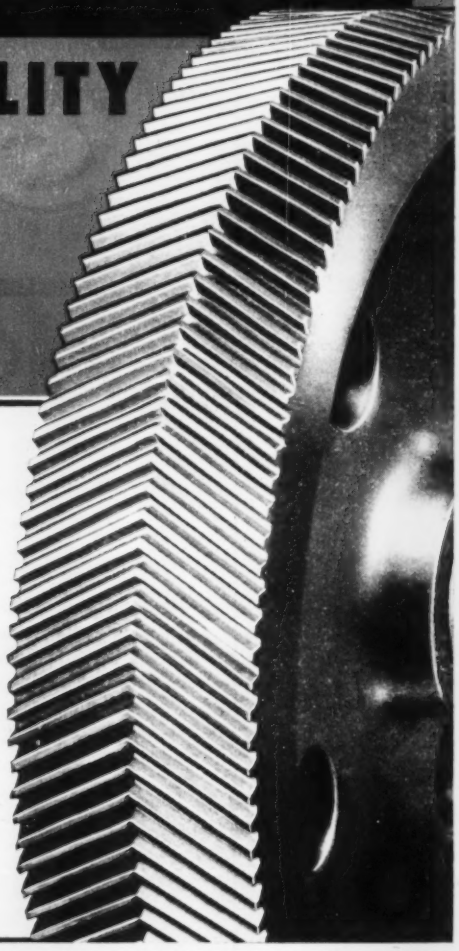
THERE'S NO DOUBT . . . THEY HAVE

"Custom Built"

QUALITY



Philadelphia Herringbone Reducers are made in single, double (shown here) and triple reductions. Ratios from 1.75 to 1 to 292 to 1.



As a unit of a "standard line", the Philadelphia Herringbone Gear Speed Reducer cannot be excelled. Its superiority of design and workmanship reaches the heights of custom built quality . . . yet every part is "standard".

Of the hundreds of Units passing through the shop, the majority may look alike, yet each Unit is handled as a *special assignment*. Built right into it, are the specific service characteristics that will deliver the required power with maximum efficiency, economy, durability and minimum maintenance.

Resolved to practical terms, Philadelphia Herringbone Speed Reducers, while made to standard specifications, are produced by master craftsmen to do *your* job exactly as *you* want it done.

Write on your Business Letterhead for Catalog H49.

Philadelphia Gear Works, INC.

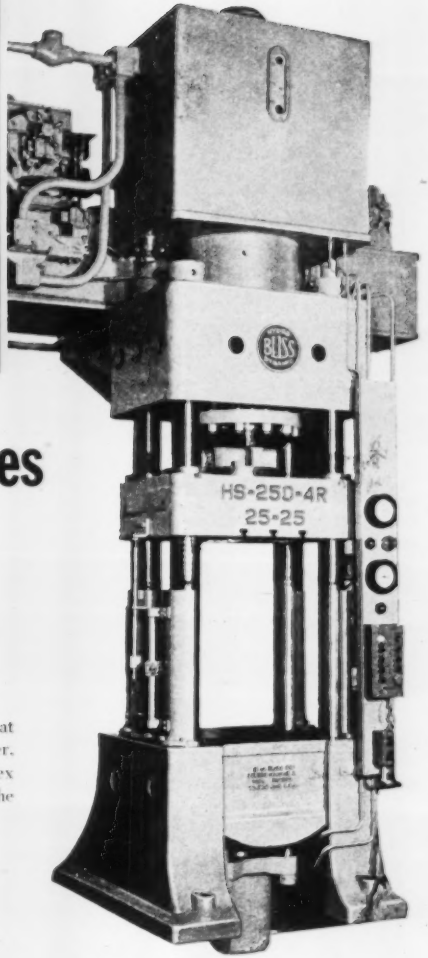
ERIE AVE. AND G ST., PHILADELPHIA 34, PA.

NEW YORK • PITTSBURGH • CHICAGO • HOUSTON • LYNCHBURG, VA.

IN CANADA: WILLIAM AND J. G. GREEY LIMITED, TORONTO

Industrial Gears and Speed Reducers

LimiTorque Valve Controls



8 Bliss Hydraulic Presses form iron powder into complex turbine blades

Intricate aircraft turbine blades, particularly complex due to the great change required from body to root, are molded from iron powder, coined and straightened in special Bliss hydraulic presses with duplex actions at Thompson Products, Inc. Thompson's engineers credit the process and Bliss presses with these advantages:

(a) *Conserving critical metals and materials*

(b) *Minimizing machining requirements*

(c) *Holding tolerances to ±0.003 in. to airfoil contour... ±½ degree of twist*

(d) *Excellent tool life—tool steel dies deliver up to 250,000 parts*

(e) *Require relatively light pressures*

Features of the Bliss hydraulic presses include dual flow pumps, rapid advance and return speeds, variable pressing speeds, automatic reversal, automatic speed change, overload protection, plus numerous other safety devices and construction refinements.

Bliss has led the way for years in the development of presses to form metal powders...has installations in leading plants using the technique. This experience is yours when you call on Bliss with your equipment problems.

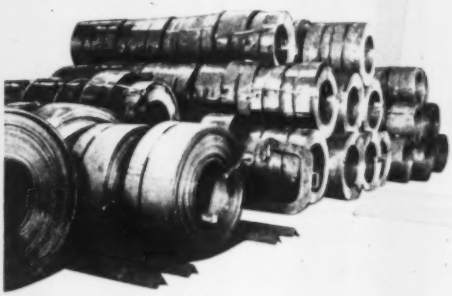
E. W. BLISS COMPANY, Canton, Ohio

Mechanical and Hydraulic Presses, Rolling Mills, Container Machinery

From a Single Press for a Given Job...to a Complete Press Room...

It's Bliss

QUICKER DELIVERIES, LOWER COST OF *Coiled Strip*



"Since we installed the Yoder Slitter, we have had very little trouble in obtaining deliveries of coiled strip sufficient for our needs."

"We can now buy available mill-widths almost anywhere, instead of being confined to those relatively few sources able to supply special widths."

"Since it is no longer necessary for us to keep in stock a larger number of special widths, our inventories have been cut in half or better. As long as we have on hand the proper gauges, we can slit as needed to the exact widths required . . . ."

The above, in effect, is the common experience of fabricators and warehouse operators who have installed Yoder slitters for coils and sheets. In addition, there is a saving of anywhere from $5.00 up to $100.00 or more per ton in the purchase price of coiled strip. A Yoder Slitter may, therefore, be highly profitable for requirements as low as 1000 tons per year, more or less, depending on widths and gauges required.

Send for 76-page book on the economics as well as the mechanics of doing your own slitting. Consultations, recommendations, estimates without cost or obligation.

THE YODER COMPANY • 5502 Walworth Ave., Cleveland 2, Ohio

Complete Production Lines

- ★ COLD-ROLL-FORMING and auxiliary machinery
- ★ GANG SLITTING LINES for Coils and Sheets
- ★ PIPE and TUBE MILLS – cold forming and welding

ENGINEERING YODER MANUFACTURING

5 OPERATIONS ELIMINATED

with GROUND and POLISHED STRESSPROOF®

ON ONE COMPRESSOR SHAFT

REPLACED *ALLOY* STEEL!

Originally, this compressor shaft was machined from A4615 alloy steel, then carburized, quenched, cleaned, straightened, and ground twice. When the manufacturer changed to new *Ground and Polished STRESSPROOF* for this part, machining was the only operation required—all other operations were eliminated! The result: faster production and an over-all savings of 59c per shaft.

This case is typical of the dramatic results possible with *Ground and Polished STRESSPROOF*—the finest ground bar steel produced. This bar eliminates many costly manufacturing operations because of its unique combination of four important qualities in-the-bar: strength... wearability... minimum warpage... accurate polished surface. And this sensational steel machines fully 50% faster than heat-treated alloys of the same hardness!

INVESTIGATE, NOW!
Most of today's Ground and Polished STRESSPROOF is going into defense jobs. Occasionally some sizes of bars are available for testing purposes.

La Salle STEEL CO.

1414 150th Street, Hammond, Indiana

Manufacturer of the Most Complete Line of Carbon and Alloy Cold-Finished and Ground and Polished Bars in America

Balanced Heat Flow IN 'SURFAC

VOLUME PRODUCTION AND CLOSELY CONTROLLED ANNEALING, UNHEARD OF IN PAST EMERGENCIES, ARE POSSIBLE FOR TODAY'S DEFENSE AND CIVILIAN REQUIREMENTS.

Shown here is a battery of 'Surface' radiant tube coil annealing covers of the rectangular double-row type utilizing a protective controlled atmosphere for bright annealing rolled steel sheets.

Four 'Surface' developments, used together in a balanced heat transfer system, *are breaking records for top speed and true quality in annealing.*

'Surface' harnesses heat for the steel industry. Hundreds of 'Surface' annealing covers and bases in America's leading steel mills employ the components shown below to produce thousands of tons of bright-annealed flat rolled steel each hour. They are operating in every important steel mill center from coast to coast.

1 **COIL SEPARATOR** ● Simple, rugged construction balances convection heating and cooling. Directs rapidly circulated heating and cooling gases to ends of coil laminations. This utilizes solid metal heat transfer, rather than conduction through laminations.

2 **HIGH POWERED BASE FAN** ● Power input is many times greater than used formerly. Incorporates a unique 'Surface' designed method of sealing annealing atmospheres against differential pressures.

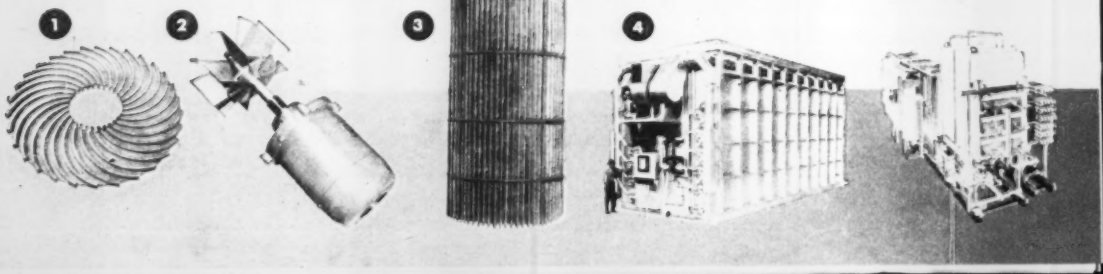
3 **CORRUGATED INNER COVER** ● Deep corrugations absorb and transfer heat to circulated gases within the inner cover during heating cycle and speed cooling of the charge by reasons of the large area exposed.

4 **RADIANT TUBE HEATING COVER** ● Stepped-up, useful heat input of 'Surface' radiant tubes balances the fast heat absorption rate of the new deep-corrugated inner covers and fast heat transfer of base fans and coil separators.

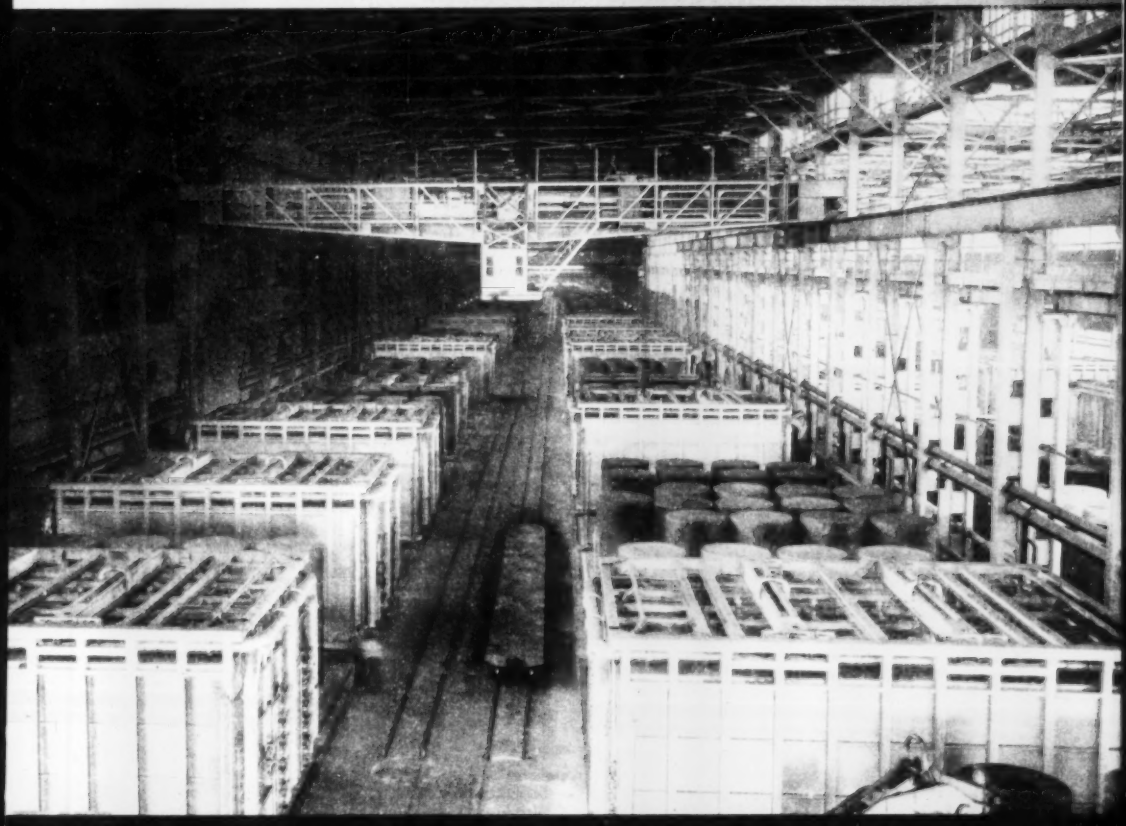
Here's an additional 'Surface' development that assures "Quality Control" of heat treated products.

HNX ANNEALING ATMOSPHERE GENERATOR ● Non-explosive HNX gas provides complete surface protection for steel in 'Surface' cover-type annealing furnaces. HNX is an improved form of widely accepted NX gas.

Submit your heating and heat treat problems to 'Surface' engineers for heat-engineered recommendations and latest equipment.



OVERS...RESULTS IN FASTER AND BETTER ANNEALING



SURFACE COMBUSTION CORPORATION • TOLEDO 1, OHIO

FOREIGN AFFILIATE COMPANIES

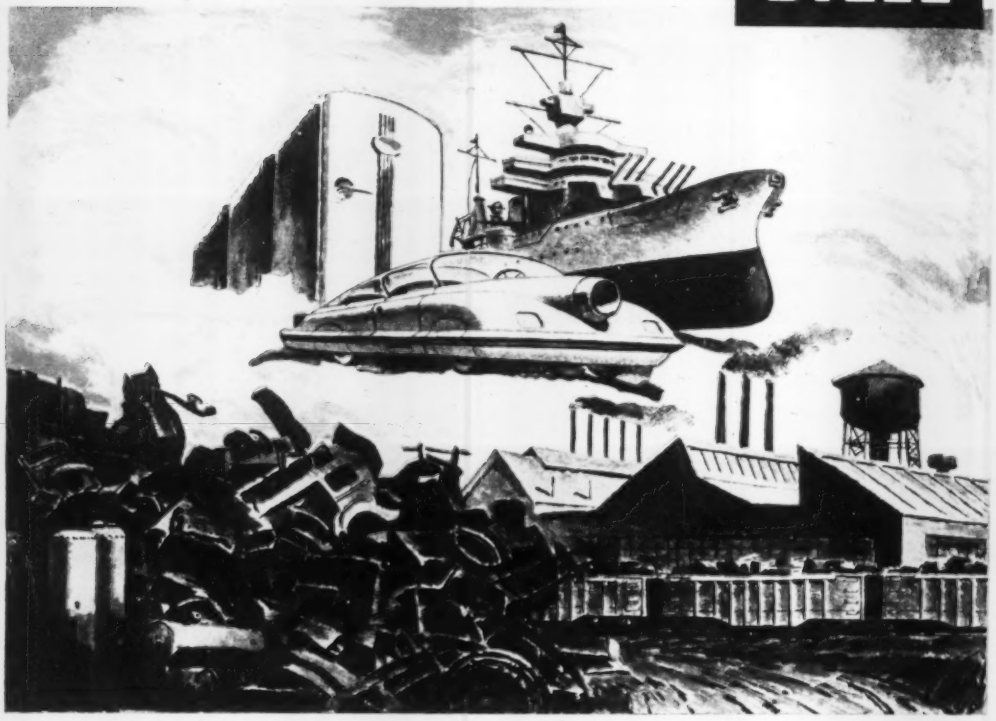
BRITISH FURNACES LIMITED—CHESTERFIELD
STEIN & ATKINSON, LTD.—LONDON
STEIN & ROUBAIX—PARIS, LIEGE AND GENOA
WILL L. SMITH, S.A.—BUENOS AIRES

'Surface' SERVES THE STEEL INDUSTRY

One-Way Fired Soaking Pits • Billet Reheating Furnaces • Slab Heating Furnaces • Continuous Type, Controlled Atmosphere Strip Annealing and Normalizing Furnaces • Controlled Atmosphere Annealing Covers for Wire and Rod • Controlled Atmosphere Annealing Covers for Coil and Sheets • Continuous Furnaces for Heat Treatment of Steel Plate • Controlled Atmosphere Furnaces for Carbon Correction in High Alloy Rod and Bar Stock • Continuous Type Bright Annealing and Normalizing Furnaces • Prepared Gas Atmosphere Generating Equipment • Pit Type Convection Furnaces for Rod Annealing • Stress Relief Furnaces • Wire Patenting Furnaces

LET'S BUILD THOSE
CRUISERS • CARS • REFRIGERATORS
HIDING IN YOUR OPERATION!

J&L STEEL



How much scrap is wasting away in your Plant?

Yes . . . hiding . . . gathering dust . . . rusting away! Whatever your business, you probably have more scrap iron and steel laying around your plant or operation than you imagine. Today, this scrap is one of America's most precious raw materials. It is needed urgently —every single ton saves vital ore. Get *your* scrap in. *Maximum quotas of steel cannot be obtained without it.*

Check NOW. Look for obsolete iron and steel machinery . . . fixtures . . . chains . . . broken parts—any old metal that's just gathering dust. Get it all together, call your scrap dealer. He'll pay you for it and get it back into production. Do it right away.

SCRAP IS YOUR BUSINESS, TOO!

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PA.

To the man who needs help in metal finishing

Here's how you can benefit from United Chromium's long specialization in

COATINGS FOR METALS

Are the finishes required in your defense production a problem to you?

You'll save yourself time and trouble by contacting *one* dependable source for *three* types of coatings used: *plated* . . . "*painted*" . . . or *chemically produced*. As specialists in "coatings for metals", United Chromium can help you lick many problems of applying ordnance finishes . . . with the right coatings to do the job.

A *few* of the many finishes offered: Quick-drying, lusterless organic protective coatings for armaments . . . Black, olive drab or yellow chromate finishes for zinc, cadmium, die castings . . . Hard chromium plating which you can do 20% to 80% faster in Unichrome S.R.H.S. Solution than in ordinary chromium baths . . . Ucilon Protective Coatings which have proved outstanding against acids, alkalies, salts, water, oils.

Write or phone us on *your* needs in finishes for metals . . .

UNITED CHROMIUM, INCORPORATED

100 East 42nd St., New York 17, N. Y.

Waterbury 20, Conn. - Detroit 20, Mich. - Chicago 4, Ill. - Los Angeles 13, Calif.

In Canada: United Chromium Limited, Toronto, Ont.

UNICHROME Trade Mark

COATINGS for METALS

"Tycol Apreslube cuts bearing failure... keeps production going at top speed"

That's correct! Tycol Apreslubes are extreme pressure lubricants that stand up under severe heat and moisture conditions, under tremendous loads. They inhibit rusting, and are highly stable.

Tycol Apreslube means lower lubrication costs... longer equipment service life... and positive protection against excessive gear and bearing wear.

For complete data, call or wire your nearest Tide Water Associated office.

TYCOL

INDUSTRIAL LUBRICANTS

Boston • Charlotte, N. C. • Pittsburgh
Philadelphia • Chicago • Detroit
Tulsa • Cleveland • San Francisco

TIDE WATER ASSOCIATED OIL COMPANY

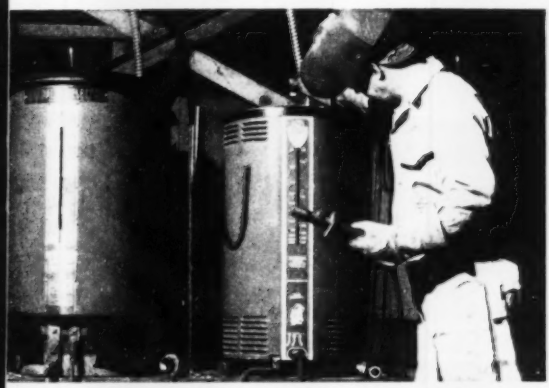
17 BATTERY PLACE - NEW YORK 4, N. Y.

SEND FOR A FREE COPY OF "TIDE WATER ASSOCIATED LUBRICANIA"

Here, Alco welders help meet production schedules on locomotive frames, vital to defense, by using G-E a-c welders. AC welders eliminate troublesome arc-blow encountered when welding high-tensile steels with d-c equipment.

100% A-C WELDED!

Here's How Alco Produces Road Locomotive Frames with G-E Welders



Shown above are two of the many G-E a-c welders used at Alco.

Corners can be difficult to weld, but the absence of troublesome arc-blow with G-E a-c welders enables this operator to lay an even corner bead in any position.

Diesel-electric road locomotive frames are 100% a-c welded at the Schenectady, N. Y., plant of American Locomotive Company. Alco welding engineers report that General Electric a-c welders eliminate troublesome arc-blow, make for easy striking, cost less than d-c, use less power and are easily maintained.

Like the American Locomotive Company, you may also find that you can speed production by using G-E a-c welders. For example . . .

YOU CAN WELD BETTER WITH AC

You have complete control of the arc in all positions because G-E a-c welders eliminate troublesome arc-blow. This reduces the danger of undercutting and slag inclusions and produces better welds.

YOU CAN WELD FASTER WITH AC

In almost every case you can use higher currents and larger electrodes. That means more footage. Users report increases of 10 to 50%.

YOU CAN WELD AT LOWER COST WITH AC

G-E a-c welders cost less than d-c equipment of the same rating. They use only one-fourth as much power when idling and have much lower load losses. And because there are no rotating parts, maintenance is practically negligible.

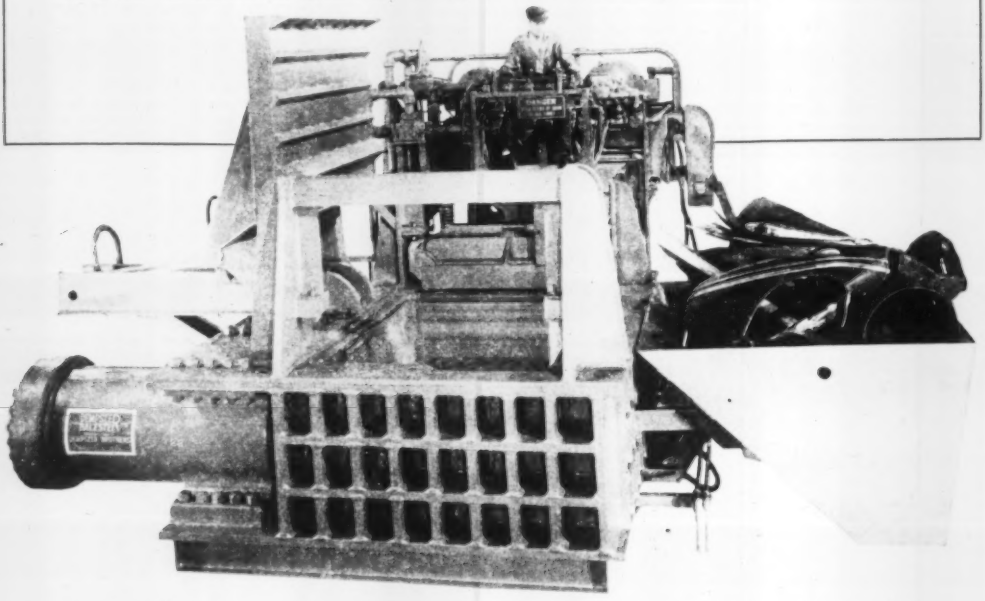
SEE YOUR G-E WELDING DISTRIBUTOR!

He's listed in the yellow pages of the telephone directory. Just look for General Electric under "Welding Equipment." Your distributor carries a complete line of welders, accessories and electrodes. General Electric, Schenectady 5, N. Y.

GENERAL ELECTRIC

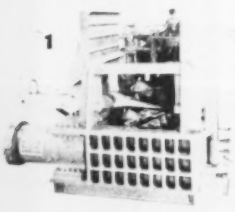
211-12

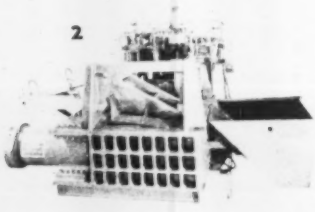
You Can Save Thousands of Dollars In Installation Cost Alone With the Big Capacity Dempster-Balester "600"

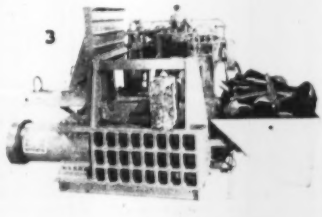


Installation expense of a big capacity scrap metal baling press need no longer be a costly item running into several thousand dollars. On the Dempster-Balester "600" all hydraulic assemblies are integral to the machine itself. The "600" is self-contained, requiring no air compressors, springs, counter-weights or supplementary equipment for its operation. Therefore, only a simple foundation and small pit for ejector are required. In many cases, the "600" has been assembled and in operation in three to four days after arrival. This mighty "600" turns out high density 16"x18"x35" bales at the rate of 6 to 7½ tons per hour. This rate is increased by a conservative 25% with Auxiliary Compression Door.

Photos below show the complete baling cycle of the Dempster-Balester "600" with Auxiliary Compression Door . . . offering you the nearest thing available to automatic baling! 1—Skip Pan dumps scrap metal into charging box. 2—Compression Door compresses scrap with a 45-ton force plus the 4500 pound weight of the door and Skip Pan returns for reloading. 3—Compression Door returns to up-right position while scrap is baled. Then finished bale, weighing between 600 and 1,000 lbs., is ejected. Write today to Dempster Brothers, Inc. for folders on the complete line of Dempster-Balester Presses!







DEMPSTER BROTHERS, 6101 Dempster Bldg., Knoxville 17, Tenn.

Gears **that outlast the years . . .**

GEAR LIFE is directly dependent upon the experience, facilities and policies of the manufacturer. *Illinois Gear* offers you an experienced team of qualified technical men and highly skilled craftsmen working with the newest and finest gear manufacturing equipment available. *Illinois Gear* follows a conscientious policy of producing the finest possible work and then subjecting it to the most critical inspection. For gears that outlast the years, write, wire or phone:

Gears for Every Purpose

ILLINOIS GEAR & MACHINE COMPANY

2108 N. NATCHEZ AVE. • CHICAGO 35, ILLINOIS

Using Unfamiliar Alloys?

Here's How to Remove

THE RISK

Today, when Government restrictions are enforcing the use of leaner alloys with unfamiliar heat treatment response, you'll find Ryerson Alloy Service more helpful than ever. The tests we make to assure quality, verify analysis and guide your heat treating are your best protection against costly production errors.

For example, we put every heat of Ryerson Alloy through four separate hardenability tests. The result: Positive knowledge of the hardenability of every shipment of Ryerson alloy. These tests enable you to buy on the basis of hardenability, in addition to analysis—*the only really safe way to buy alloys under today's conditions.* All test information—hardenability, analysis, etc.—is carefully recorded on a Ryerson Alloy Certificate which is delivered with your steel as a guide to heat treatment.

Don't take today's alloys for granted. Order by hardenability from Ryerson and be doubly sure. Some shortages are inevitable, but, as always, we'll do everything possible to meet your requirements. So, for any steel need, phone the Ryerson plant nearest you.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC.—PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • DETROIT • CINCINNATI
CLEVELAND • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO

STEEL

The Metalworking Outlook

October 15, 1951

Tune-up on CMP

"So far our experience with CMP has been a disappointment." That statement comes from I. W. Wilson, president of Aluminum Co. of America; it echoes the feelings of many in metalworking. The rebuttal from CMP officials goes like this: "CMP is working fairly well. Inequities, yes, but industry expects too much. The problem of getting CMP to work smoothly now under part-war-part-peace conditions is more difficult than it was during World War II when we had an all-war economy." Despite that government stand, Washington is listening more closely to industry complaints. Watch for more extensive tune-up jobs on the plan in the next month or two.

Pick and Choose

One phase of CMP that may be tinkered with is the pick-and-choose rule whereby steel mills are permitted to serve their customers pretty much on an historical basis. Although the pick-and-choose right was granted in the third quarter, it came too late to be tried out then for fourth-quarter mill bookings and has just had its trial, for first-quarter business. When the results of that trial have been evaluated, Washington may come up with modifications.

A Matter of Compliance

A compliance section is now pretty well organized to start cracking down on violators of NPA regulations. One way it will operate is by checking on blind ads offering steel, particularly in newspapers. Blind ads are those that give a box number but no company name for a reply. The compliance section says it will operate on the assumption that industry wants to do the right thing. One of the unit's functions will be to show how people can live under controls.

A Matter of Definition

Some of the talk about defense production being behind schedule because of the slow delivery on military items is misleading. The military doesn't consider an item "delivered" until every last gadget is on it. Trucks may already be in operation by the Quartermaster Corps—and this has happened—although they are missing rear-view mirrors or spare wheels and tires. Officially, those trucks are not yet "delivered."

Shifts in Expansion

About 70 per cent of the certificates of necessity granted since K-day have been for facilities that could also be used to turn out or figure somewhere in the production of civilian items. In contrast, a big part of World War II plant expansion occurred in explosives and ammuni-

Production-Engineering News—p. 75 *The Market Outlook—p. 141*

tion loading, guns and ammunition, aircraft, and ship construction and repair—where little peacetime use can be made of the production of such facilities.

Danger Signals Ahead

The fur will fly when the CIO United Steelworkers of America and much of the steel industry begin wage negotiations, probably about Dec. 1. CIO President Philip Murray has gone on record as saying a 4-cent raise won't be enough. Steel executives are alarmed because costs have already gone up so much that they have had to ask OPS to boost the ceilings on their products.

Welding Rod in South America

European producers of welding electrodes are doing well with sales in South America, but they can't crack the U.S. market. Their sales argument in Latin America is shorter delivery dates and lower prices, in some cases, than can be offered by U.S. producers, who have all they can do to keep up with domestic demand.

Push on Boron

Watch for the development of boron steels to be pushed more rapidly to conserve our dwindling supplies of the more versatile alloys. "We must unveil boron's mystery and make knowledge of it commonplace," says Charles M. Parker, metallurgical engineer of American Iron & Steel Institute. British engineers, incidentally, have been studying boron, but their findings thus far have not been encouraging and interest there in the element is ebbing.

Straws in the Wind

The military hates to freeze models because improvements are coming out at a Buck Rogers pace, especially in electronics . . . Two new NPA orders soon to appear will involve conversion steel and aircraft quality steels . . . Deliveries of twist drills, reamers and other cutting tools are improving . . . Congressional tax conferees have agreed to permit corporations to carry forward for three years net losses incurred in 1948 and 1949 . . . Another 100 Liberty ships will be demothballed by Nov. 3 to bring to more than 400 the total taken out of the reserve fleet; most are used to carry coal and grain under the economic assistance program.

What Industry Is Doing

Common sense can help you stretch your steel supplies (p. 47) . . . Industrial scale makers seek to avoid output cutbacks because of metal shortages (p. 50) . . . Industry will spend $14 million this year on floor maintenance equipment and accessories (p. 51) . . . Plan new and converted plants to produce for war, peace or both, says GM's Wilson (p. 57) . . . Some 35,000 items of scientific apparatus help pace the nation's progress (p. 58).

UNITED
MACHINE SCREWS
TAPPING SCREWS

If you are seeking a good source for your machine screw and tapping screw requirements with standard or special head designs in sizes ⅜" and smaller, you will find "UNITED" ready and able to fill your needs.

Machine screws and tapping screws are also made and carried in stock with the famous "Clutch-head" patented recessed head.

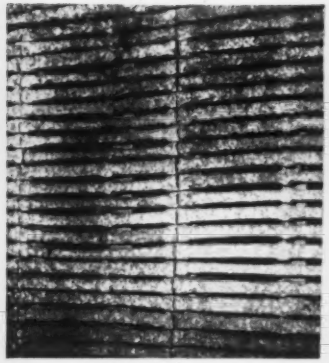
Ask for a descriptive brochure.

—when you think of fasteners think of United

SCREWS · NUTS · WASHERS
CLUTCH HEAD SCREWS
STAMPINGS

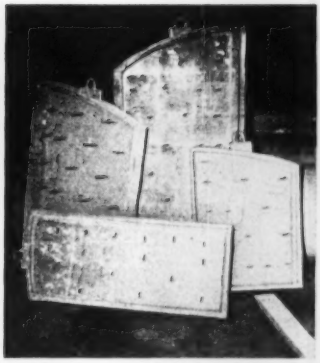
United Screw and Bolt Corporation

Chicago 8 Cleveland 2 NewYork 7



COMPARISON OF GRATE MATERIAL

Gray iron sintering grates, at left, show bad scaling and warpage after a single month of use. Note good shape of Ductile Iron grates, above, after same service. They greatly outlasted gray iron grates.



DUCTILE IRON FURNACE DOORS SAVE MONEY, TIME AND LABOR—In ordinary iron, exposed to high temperature, internal oxidation easily penetrates along paths of flake graphite, thus causing destructive growth. Penetration is curbed in Ductile Iron, since its graphite is wholly in spheroidal form.

DUCTILE IRON Sintering Grates and Furnace Doors *excel in elevated temperatures*

Performance Records Show Outstanding Heat-Resistance of this New Material.

Tests show that iron containing graphite wholly in spheroidal form provides notably greater growth resistance than ordinary gray iron.

FOR INSTANCE: Gray iron and Ductile Iron grate bars in the Greenawalt sintering system of a merchant pig-iron producer gave the following performances:

At the Canadian Furnace Company, Ltd., in Port Colborne, Ontario . . . from date of their installation, August 1950, to June 1951 . . . no Ductile Iron grates needed replacements although 150 gray iron grates had to be replaced after 6 weeks' service.

The sinter-plant foreman stated, "*The Ductile Iron grates still seem to be as good as new.*" Cast by Lakeside Foundry, Ltd., of Port Colborne, these Ductile Iron grates also out-performed steel grates tested previously.

ANOTHER EXAMPLE: The forging furnaces of a leading steel plant now have Ductile Iron doors supplied by United Engineering and Foundry Company, Pittsburgh 22, Pa. Gray cast iron doors which were subjected to 24 hours' continuous service daily, heat-cracked after an average life of about four weeks. A trial lot of annealed Ductile Iron doors lasted 17 weeks . . . or more than four times as long as those of gray cast iron.

APPLICATIONS: As cast, as well as heat-treated Ductile Iron parts . . . serving at elevated temperatures in scores of machinery, engine and furnace applications . . . provide a growth-resistance heretofore unavailable in gray cast iron.

AVAILABILITY: Send us details of your prospective uses, so that we may offer a list of sources from some 100 authorized foundries now producing Ductile Iron under patent licenses. Request a list of available publications on Ductile Iron . . . mail the coupon now.

The International Nickel Company, Inc.
Dept. S, 67 Wall Street, New York 5, N. Y.

Please send me a list of publications on:
DUCTILE IRON

Name _____ Title _____

Company _____

Address _____

City _____ State _____

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

Our Advantage

Washington officials are so prone to exaggerate the strength of Russia and to minimize our own that it is refreshing to look at reliable statistical comparisons. "Automobile Facts and Figures," just issued by the Automobile Manufacturers Association, shows that in prewar 1938 the United States produced 2,489,085 motor vehicles and Russia turned out 210,731 units. In postwar 1950 our nation assembled 8,003,045 units and the Soviets 500,000.

Here is an increase for the United States of 222 per cent against an increase for U.S.S.R. of 137 per cent. While these percentages are highly favorable to our side, they do not tell the whole story. The 1950 output in the United States included 6,665,863 passenger cars or 83 per cent of the total. In Russia, of the 500,000 units produced in 1950, only 75,000 or 15 per cent were passenger cars. The remaining 85 per cent were trucks and busses.

This is highly significant. AMA studies show that 73 per cent of the private automobiles in the United States in 1950 were used by their owners in getting to and from work, conducting business or doing work on the farm. In America the private car is a commonplace adjunct to the job.

A good way to illustrate what this really means is to relate the impressions of a German youth who is studying in the United States on an exchange basis. Years ago he visited a large automobile plant in Russia. Approaching the plant he asked his guide, "Who owns this plant?" The guide replied proudly, "We, the people, own it." "Who owns those two automobiles?" asked the German. "Those belong to the commissars," he replied.

A few months ago this German student visited the River Rouge plant of Ford Motor. In writing in the "Cleveland Plain Dealer" of his visit he said that he asked his guide who owned the plant. The answer was "the Ford family." "Who owns those thousands of automobiles?" asked the visitor. "They belong to the workers," replied the guide.

Our distribution of goods to the many is an advantage Stalin will find difficult to overcome.

E. L. Shaner

EDITOR-IN-CHIEF

READY FOR ANYTHING: Is the sequence of war, peace, crisis, preparedness ad infinitum becoming so commonplace that we may be obliged to accept a new concept as to what a modern manufacturing plant should be?

C. E. Wilson, president of General Motors Corp., thinks so. He suggested to the American Ordnance Association that manufacturers who are expected to assume responsibility for producing highly technical military items be pre-

pared to operate dual-purpose plants that can be operated in three ways: For combined peacetime and war production, for total war production, or for total civilian production. This concept, says Mr. Wilson, avoids to a large extent the necessity of forming a separate war industry, whose interests and employees depend solely upon war or crisis for its operation.

More or less unconsciously we have been drifting toward the concept of triple-duty plants which Mr. Wilson advocates. If we are to live in almost constant turmoil, we might as well plan facilities that are flexible. —p. 57

* * *

USE STEEL SENSIBLY: A manufacturer who had been using drawing quality hot-rolled strip steel 0.109 inch thick for making carburetor air filters switched to drawing quality cold-rolled aluminum-killed strip only 0.065 inch thick. He found that the filters were just as good and that he was almost doubling the number of filters he could make from a ton of steel.

A farm equipment manufacturer had been paying the extras for stretcher leveling and resquaring on large steel sheets. He checked the use of these sheets on a certain farm implement and found he could quit specifying stretcher leveling and resquaring. Cutting out these extras saved him about $20 a ton.

These are two of numerous examples that could be cited of how smart steel users can conserve steel and save money by sensible usage and sensible buying of steel. —p. 47

* * *

SCRAP IN ODD PLACES: In a large measure the present intensive drive for scrap places major emphasis upon collections from the known important sources. These include industry, railroads, automobile graveyards, public utilities and farms. Surprising as it may be, some worthwhile tonnages have been recovered from unexpected, unorthodox places—quite remote from these routine sources.

Here are a few illustrations: Gimbel's Philadelphia store, 450 tons; five Hollywood moving picture studios, 100 tons; Western Union in Richmond, Va., 1700 feet of copper tubing; Galion, O., 200 tons from miscellaneous non-industrial sources. These cases may well suggest to industrial executives in many localities obscure or unorthodox sources of scrap. If so, communicate your hunch to somebody in the scrap drive who can act upon it effectively. Every little bit helps! —p. 58

* * *

WHY BORON IN STEEL: Since 1938 about half a million tons of boron steels have been used successfully in engineering applications. A few companies—including Buick Motor Division, Park Drop Forge Co., Plomb Tool Co., Caterpillar Tractor Co., Mack Mfg. Co. and Pratt & Whitney Aircraft—have gained considerable experience in the commercial use of these steels. In spite of this impressive evidence, many users of engineering steels still seem to be reluctant to try boron types.

Part of this reluctance may stem from some of the "trick" names that have been applied to boron steels. Certainly such terms as "vitamin-treated," "needled" and "hopped-up" are not conducive to confidence in boron as an element in steel. Also, reluctance probably results from the fact that authoritative information regarding the use of boron has not been widely disseminated.

This latter deficiency is in the process of being corrected. Boron steels deserve immediate attention for two excellent reasons: 1. Experience has demonstrated that they possess desirable characteristics. 2. Their widespread use will conserve our supply of more critical alloys. —p. 76

* * *

1-COAT ENAMEL TOUGH: An Ohio company has developed a one-coat process of applying shock-resistant coatings of porcelain enamel to nonpremium steel. The process is said to produce a completely satisfactory porcelain enamel finish with a thickness of 0.003-inch which reduces the danger of chippage from mechanical shock to a minimum. It is believed lower firing temperatures will be in order in the future utilization of the process and this will minimize the warpage of complicated shapes and reduce costs.

To date, commercial use of the process has been confined to one item of production, a fluorescent lighting fixture. Thousands of these fixtures have been delivered to the lighting division of a large electrical equipment manufacturer. After more experience in production has been accumulated, the company expects to employ the process in the manufacture of enameled ware for refrigerators, range tops, kitchen cabinets, bathroom tiles, etc. —p. 84

"Paper Bath Towels? I thought they were kidding!"

"But you know something, Mister? These NIBROC PAPER BATH TOWELS aren't like ordinary paper towels at all! They're super-absorbent, super-strong, and really do a super-duper drying job!"

MAN SIZE! A whopping big 18" x 40"—and two thicknesses!

DRY THOROUGHLY! They're wonderfully absorbent, lint-free, and soft to the skin. Exclusive processing methods give them exceptional wet-strength, too!

MORE SANITARY! No damp towels hanging in lockers to give off odors. Less chance to spread communicable diseases that cause absenteeism. Use them once, throw them away.

SAVE YOU MONEY! They cost less in the long run because they end laundering, stop losses, eliminate excessive handling and storage.

ALWAYS AVAILABLE! Regardless of variation in number of employees, you always have an adequate supply on hand.

NATIONALLY KNOWN! Nibroc *hand* towels are the world's largest selling paper towel for industrial and institutional use. Nibroc bath towels are of the same fine, dependable quality, yet made of heavier stock.

SEND COUPON FOR DETAILS TODAY! Learn how Nibroc Bath Towels cut shower room costs; increase employee comfort and morale.

NIBROC® PAPER BATH TOWELS

A PRODUCT OF QUALITY BROWN Company

Berlin, NEW HAMPSHIRE

GENERAL SALES OFFICES: 150 CAUSEWAY STREET, BOSTON 14, MASS.

Branch Sales Offices: Portland, Me., New York, Chicago, St. Louis, San Francisco, Montreal

SOLKA & CELLATE PULPS • SOLKA-FLOC • NIBROC PAPERS • NIBROC TOWELS • NIBROC KOWTOWLS • BERMICO SEWER PIPE, CONDUIT & CORES • ONCO INSOLES • CHEMICALS

NIBROC TOWELS GET YOU BONE DRY

BROWN COMPANY, Dept. ST-10
150 Causeway Street, Boston 14, Mass.
Please send me full information on Nibroc bath towels.

*Name*_____

*Company or Organization*_____

*Street*_____

*City*_____ *Zone*____ *State*_____

"Those blanks aren't scrap... they're saleable steel", agreed Norm

Waste is something Norm can't stand. The same goes for Tom Brinker, manufacturer of portable welding units and a long-time Inland customer. "Every time you form a lamination for your welder," Norm observed, "you leave a 4 x 7 inch piece of 22 gauge electrical sheet steel that you can't use. Why not let us find you a customer for those blanks?"

Norman Grant is an Inland Steel sales representative. His experience told him that those 4" x 7" blanks had more than scrap value. Especially at a time when steel is in such great demand. With his trade contacts, Norm was sure he could find a buyer.

A few days later, on his way to visit another Inland customer, Norm had almost driven past the plant of an outboard motor manufacturer when he got a flash . . . "motors!" He stopped. Sure enough, that manufacturer had a pressing need for steel for his magnetos . . . and 4" x 7" was a perfect size.

Result: An Inland customer's profit was augmented by the sale of otherwise waste blanks and a motor manufacturer got steel he sorely needed. INLAND STEEL COMPANY, 38 South Dearborn Street, Chicago 3, Illinois.

Your scrap is needed by the steel industry for national defense.

Names used are fictitious.

Making your steel is only part of our job.

S-t-r-e-t-c-h Your Steel Supply

Here are some tips on how to do it and also how to save money in buying. Read how one company boosted output 100 per cent at an added cost of only 5.5 per cent

By VANCE BELL, *Associate Editor*

THAT PRODUCTION LINE streiching out into infinity on the cover suggests there's no end to opportunities to stretch your steel supply and save money in buying steel. Maybe you can't go so far. But how far can you go? This article is designed to stimulate you into seeing what you really can do.

IF YOU could increase your production 100 per cent but pay only 5.5 per cent more to do so you'd jump at the chance, wouldn't you?

If you could do that several times you could stretch your precious steel supply and save money at the same time. Too much to expect, you think? No, it isn't! There are many opportunities in more sensible buying and more sensible usage.

Case Study—Listen to what one Michigan automobile manufacturer did. To make a carburetor air filter, the company was using drawing quality hot-rolled strip 0.109 inch thick. The company found it could get just as satisfactory a product by switching to drawing quality cold-rolled aluminum-killed strip of approximately half that thickness—0.065 inch. Thus, there was an increase of almost 100 per cent in the number of air filters that could be turned out per ton of steel.

Happy Ending—Base price plus extras on the hot-rolled strip was $5.50 per hundred pounds; on the cold-rolled strip, $5.80. Thus the cost of the cold-rolled was only 5.5 per cent more than the cost of the hot-rolled. And the metalworking plant got a steel that was easier to fabricate and that yielded a product of improved performance.

With defense production expanding in volume it is doubly important that you try to get your share of any increase in yield from raw materials. In peacetime, between 11 and 13 per cent, on the average, of all finished steel shipped by steel mills winds up in a scrap heap. In war time, this loss soars to about 20 per cent.

Ways to stretch your steel supply and save money can be classified under two headings: Sensible usage. Sensible buying.

Sensible Usage

Under the heading of Sensible Usage are these tips for you:

Start with the designers. The idea of conservation must be instilled into the minds of the designers of your products. Design engineers must be urged to scrutinize all designs with an aim of using less metal to do the job. If they don't design your products to use the least possible metal they've nullified many metal and money saving opportunities before you ever get the product into production.

Production workers can help. When the product's ready to go into production make the production workers conservation conscious by pointing out that work schedules depend on available materials and on how efficiently they are used and that available materials can be stretched over longer production runs by eliminating such practices as continuing to operate a faulty machine, using dull tools, working with improper setups, faulty workmanship and handling the product carelessly. Ask the production workers for suggestions on how to improve the yield.

Use proper shapes of steel. You may find, for instance, that use of sheet or strip in coil form may offer advantages over cut lengths. The uninterrupted length of coils may permit more flexibility than cut lengths in blanking, thus reducing the amount of scrap remaining after blanking. Use of coils will save you from size extras for length. As quoted by a major producer, the length extras on hot-rolled carbon sheets range from $1 to $20 a ton; on cold-rolled carbon sheets, from $2 to $9 a ton; and on hot-rolled carbon strip, from $1 to $20 a ton.

If you already are using sheet or strip in coil form, consider the use of larger coils than you have been using. Scrap from the beginning and end of one long coil is no more than it would be from a short coil. Investigate the largest coil that conceivably could be used on your equipment, and then check with the mills to see whether they can supply your needs. Some mills are equipped to provide coils as large as 60,000 pounds.

Start With Your Designers

If you set up your plant to use coils you ought to consider installation of metal finishing equipment also. In coils of steel there are some variations of surface and some of the stampings from this steel may come out with imperfect surfaces. Metal finishing equipment that will help you reclaim these few imperfects may more than pay for its cost, for it enables you to use coils economically.

If you're using round bar stock to make hollow cylindrical parts it may pay you to consider using seamless tubing, for the hole is already there. As a result, you will machine away less scrap than you would with solid bar stock. Result: More parts per ton of steel. Use of tubing also boosts the productivity of your machine tools. Since drilling the center hole is eliminated, finish boring is often your first production step. Screw machine stations are released for other operations. You have more machine capacity without adding more machines.

Use the proper grades of steel. There's a wide area for use of alternates. In the place of an ordinary carbon steel you may find it profitable to use a high strength steel so that the same strength may be obtained from thinner sections. Even with parts already in production, lighter gage sheet of a higher strength may sometimes be substituted directly without change in parts stamped. By switching to high strength steel, one railroad saved 3.36 tons of steel per freight car it built. In general, the cost of plates, structural angles, or hot-rolled sheets in high strength steel is about 50 per cent more per pound than plain steels, but designers and engineers can take advantage of the special properties of these steels and largely offset the higher

cost per pound by using fewer pounds.

Recent developments in steel plate analyses indicate there will be available soon a plate that will allow a reduction of 25 to 30 per cent in thickness, because of correspondingly increased mechanical properties. This reduction in thickness, incidentally, will cut freight costs considerably.

Consider core-plated silicon steel. If you are stamping silicon steel sheet or strip it might pay you to consider the use of core-plated material. Core-plating, which is a varnish, was originally introduced as an insulator for the steel. Usage demonstrated the varnish acts as a lubricant and prolongs the life of dies on stamping presses. Additional cost for core-plating is 30 cents per hundred pounds for 24-gage and heavier and 40 cents per hundred pounds for 25 to 27 gage.

Analyze your blanking practices. You may find you can reduce your scrap loss. Sometimes changing the sheet or coil size will reduce scrap from blanking and forming operations.

Analysis of blanking practice by a large manufacturer of automobiles brought about an 80 per cent reduction in scrap loss from breakage of oil pans that were being fabricated through a deep drawing operation. The pans were being made from fully aluminum killed cold-rolled steel sheets. The sheets being ordered were 0.048 inch thick, 35.25 inches wide and 43 inches long. The user changed his dimensional specification to 43 inches by 71 inches, so that the direction of rolling and subsequent direction of the steel grain would be at right angles to the previous direction. Where loss from breakage had run to 3.92 per cent of 36,000 oil pans produced before the change in blanking direction the loss after the change totaled only 0.75 per cent of 30,000 pans.

Analyze your scrap losses. Careful examination of all shearings, skeletons, offal blanks, trimmings and bar ends may show how these and other forms of scrap can be utilized in producing smaller parts. Sometimes minor design changes or minor changes in the layout will permit a sheet to be used more effectively. Shifting the layout so as to produce scrap pieces of larger size may permit such pieces to be used more efficiently. In some cases simply changing the position of locating pins will permit use of odd pieces that formerly were scrapped. Slugs or blanks of uniform size from press operations very often may be magazine-fed in the press production of smaller parts.

Some of the scrap you can't use may just fill the bill of materials for some other metalworking plant, particularly in these times of heavy demand for steel. A maker of portable welding units saw 4 inch by 7 inch pieces of 22-gage electrical sheet steel piling up from a blanking operation. What to do with them? An outboard motor manufacturer was found who had a pressing need for electrical steel for magnetos. And 4 x 7 inches was a perfect size for him.

Can You Use High Strength Steel?

Reduce rejects. One of the ways to reduce the volume of rejects is to improve your methods. Perhaps better quenching practices are what you need. A quenching technique recommended by one major steel producer extracts heat rapidly and evenly from every part of the steel's surface. This method is said to improve mechanical properties, reduce cracking, and improve machinability, and reduce rejects to nil.

After doing everything possible to reduce scrap and rejects, the next step is to see what can be done to repair the remaining rejects to meet specifications. Sometimes only a simple straightening operation is required. In other cases a moderate amount of machining may do the job. Care, however, must be exercised to avoid repair costs that exceed the cost of the original parts.

Sensible Buying

To carry sensible usage of materials as far as you can you'll readily realize that sensible buying is a necessary adjunct. So, here are some tips on sensible buying:

Don't overspecify requirements. Besides the danger of running afoul restrictions of the Controlled Materials Plan the overspecifying of quality requirements costs you money. Analyze your present requirements. Maybe they aren't the same as they were a year or two ago. Remember that some of the requirements you once specified and got without extra charge now carry an extra charge.

Analyze Your Scrap

Be careful as to what requirements you specifically hold a steel producer to. In some instances, if you leave it to the steel company to provide you with what you need you will get the qualities without any extra charge. For instance, when hot-rolled drawing quality carbon steel sheets are ordered the producer assumes responsibility for selection of steel, for control of processing, and for performance of the material within properly established breakage limits. Any specifications restricting the producer's option in steel selection, heat treatment or other processing will be treated as additional requirements, subject to all applicable extras.

Perhaps you may be asking for a macroetch test on bars. Be sure you need that test. If you don't, you can avoid an extra charge of $12 a ton.

Not only will it save you money to stick to standard specifications but it will probably bring quicker delivery. Special lots as to analyses, particularly if they are for small quantities, must wait until the mill gets enough such orders for a heat.

Leave it to the producers. Steel producers, however, caution customers not to go too far in lowering standards. The producers suggest you discuss with them the qualities of steel you need. Submit to them a sample of the finished product you wish to make or give them a blueprint of the part. Let their metallurgists see your tooling for the job. If you follow these suggestions you'll be assured of the best steel at the lowest price.

Analyze the extras you are paying. While figuring out what requirements you really do not need to specify, analyze all the extras you are paying. Ask the steel producer to give you a breakdown of the prices you are paying to see whether any extras can be eliminated. Some buyers don't know what they're paying for. Extras and base prices are not uniform throughout the steel industry. (For simplicity, the extras quoted in this article to demonstrate how savings can be made are those mainly of one major producer.)

Don't feel hesitant to cut off any extras you can. Remember the steel companies aren't particularly interested in getting revenue from extras. Steel producers make their money from volume of production, not from special handling of products. Often the extra hardly pays the cost of the special handling, but if the extra charge weren't levied the volume runs of production in steel mills would be so interfered with that overall production would be cut substantially.

In analyzing the extras you are

paying give particular attention to the 10 and 15-cent ones. You've probably already weeded out any unnecessary requirements that carry large extras such as 75-cent or $1 ones, but maybe you've been careless about the ones that aren't costing you so much.

Analyzing the extras it was paying, one farm equipment maker found it really did not need stretcher leveling and resquaring on large steel sheets, for after the sheets were assembled on to a certain implement the sheet was no flatter than a commercial quality sheet. This farm machinery maker quit asking for stretcher leveling and resquaring and saved approximately $20 a ton. Stretcher leveling costs $10 a ton and the charge for resquaring is 10 per cent to be added after all other extras except those for oiling, marking and packing have been added to the price base. In this case 10 per cent amounted to approximately $10 a ton.

Using the Right Bar Sizes?

Another consumer was ordering No. 3 finish on cold-rolled carbon steel strip and paid an extra of $30 a ton for this finish. Scratches occurring in fabrication of this material necessitated the buffing of the product to restore the finish to a No. 3, so the consumer switched to a No. 2 finish, on which there is no extra charge, and buffed the finish up to a higher quality after the part was fabricated.

Which way to go. In analyzing extras, see which way you can go to save money. Sometimes a certain range of sizes carries no extras, but if you go above or below this range you will have to pay them. For instance, if you're using a hot-rolled carbon bar 1⅜ inches square you're paying an extra charge of $2 a ton. If you can just as well use a bar 1.5 inches square you can escape that $2 charge. Similarly, if you are ordering a hot-rolled carbon bar 2 inches square but could just as well use one 1 15/16 inches square you could avoid an extra of $3 a ton. Hot-rolled carbon steel bars in rounds, squares and round-cornered squares carry no extra in the size range of 1.5 to 1 15/16 inches, both inclusive.

If you're ordering quarter-inch thick hot-rolled carbon steel plate in widths of 48 inches but could use a slightly greater width you could save $3 a ton. Hot-rolled carbon steel plates a quarter-inch and more thick and over 30 inches wide but not more than 48 inches wide carry a width extra of $3 a ton. If the width is over 48 inches but not over 90 inches there is no width extra.

Mill edge vs. cut edge. If you don't need cut edges on hot-rolled sheets, don't specify them. Cut edges on hot-rolled carbon sheet in coil form will cost you from $3 to $6 a ton, depending on sheet width and thickness. Cut edges on cut lengths of hot-rolled cost $2 to $5 a ton, depending on width and thickness. If you need cut edges on a lot of material and must cut much of it to length it may pay to install shearing equipment. For cutting hot-rolled carbon steel sheets to length the extra charge ranges from $1 to $20 a ton, depending on thickness and length of sheet. For cutting cold-rolled carbon steel sheets to length the extra charge ranges from $2 to $9 a ton, depending on thickness and length of sheet.

With hot-rolled carbon strip 2 inches and narrower there's a situation just the reverse that of sheets: The extra for mill edge is higher than that for cut edge. For instance, thickness and width extra for mill edge coils of strip 0.0821 inch thick and 0.75 inch wide is $44 a ton, while for cut edge it is only $29. In that instance the additional cost for mill edge is $15 a ton.

If you have shearing equipment there are various opportunities to make it save you money. Suppose you need quarter-inch carbon steel plates 18 inches wide. To have the mill provide you with such widths would cost you $9 a ton additional. You could avoid that charge by buying plates 54 inches wide and shearing them into three pieces 18 inches wide, for on plates 54 inches wide there is no extra charge for width.

Order in multiple lengths. When you order sheets, plates or bars don't confine your specifications to mere dead lengths. This procedure often leads to a waste of material. Instead, place your orders in terms of multiple lengths. By doing this, you'll often get extra units from good steel that otherwise would become scrap.

To help steel users get the most out of available tonnage, United States Steel Co. has prepared a 72-page booklet, "Tables on Multiple Lengths." The tables can be used to determine the exact size of any given number of lengths that can be cut from a longer length.

Copies of the booklet are available free from United States Steel subsidiaries, Room 4284, 525 William Penn Place, Pittsburgh 30.

Analyze packaging extras. Perhaps some of the packaging you now are specifying could be eliminated; perhaps you are not ordering in the most economical quantities.

One Midwest metalworking company was ordering cut lengths of hot-rolled sheets in lifts of 6000 pounds and paying an extra of 50 cents a ton for this size of unwrapped lift. This company had been breaking open the lift because its lifting equipment would not handle 6000-pound loads. Since the lift had to be broken open, the steel company salesman suggested that the metalworking plant order lifts of 10,000 pounds, for lift or package weights of 10,000 pounds and over, if unwrapped, do not carry an extra.

Don't require any more wrapping or skidding of steel than is absolutely necessary to protect the steel between the mill and your production lines. The more you specify, the more it

Don't Overspecify Packaging

costs you. For instance, if you ask for individual coil packages of hot-rolled carbon steel sheets to be single paper wrapped on skids you will have to pay $5 a coil extra. If you can get by without the wrapping and the skids there is no additional charge. If you can get along without skids on individual coil packages of cold-rolled carbon steel sheets you can save $2.50 per coil.

If you are planning to build a plant or warehouse it might pay you to consult the mill from which you buy steel. Such a consultation will give you full details as to how steel is packaged, what combinations of packaging will save you the most money and what sizes of handling equipment you should have to take advantage of the money-saving.

You can take over from here. For additional ways to get more product and to save money, study your own operations and buying. You may be glad you did.

Want reprints of this article on how to stretch your steel supply and save money in steel buying? Write Readers' Service Dept., STEEL, Penton Bldg., Cleveland 13, O.

Scaled Down?

Industrial weighing equipment makers seek to avoid output cutbacks due to metal shortages

WEIGHTY questions hang in the balance for manufacturers of industrial scales.

Question One: Will they get enough materials to meet the high demand from industry? Question Two: What can they do to get more production out of the materials they do obtain?

The Big Three—Steel, aluminum and copper are the bottlenecks in industrial scale production. National Association of Scale Manufacturers Inc., Washington, thinks that just as much emphasis should be placed on allocating those metals to scale producers as to machine tool builders, because war can quadruple the need for weighing equipment.

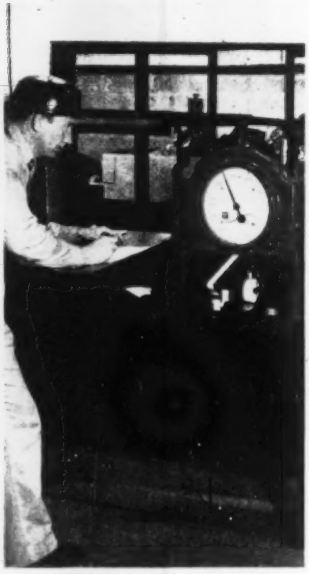
Industrial scale shipments in 1944 hit $17 million and far outbalanced the $4 million shipped in prewar 1939. Despite that fact and despite the estimate that 65 per cent of the industry's business is for defense, scale makers have had some difficulty cashing allotment tickets for controlled materials.

Demands of war call for greater accuracy in manufacturing and, hence, more scales. Manufacturers have discovered — especially since World War II — that greater accuracy pays off in peacetime, too, so weighing methods have been supplanting volume methods as a means of measurement in many peacetime activities, notably in the oil, chemical and beverage industries.

Weighty Problem—Materials shortages will probably cut back shipments of industrial scales in the second half from the sensational $15.8 million pace set in the first six months of 1951. In just six months this year, the 10-or-so manufacturers did 70 per cent as much business as they transacted in all of 1950, which itself was no lightweight year because $22.5 million worth of industrial scales went out the factory doors. The materials shortages may have other ramifications than that of forcing industrial scale users to wait a little longer than normal for the equipment on order. The scarcities may mean — although they haven't yet — that Toledo Scale Co., Fairbanks Morse & Co., Howe Scale Co. and the other manufacturers won't be able to get sufficient materials to hold on to the labor they already have, much of which is highly skilled.

Weigh the Answer—Scale manufacturers are devoting a lot of attention now to obtaining more production out of the materials they can get. Greater standardization would help, but weighing requirements are so highly specialized, so varying, that the limits to which industrial scales may be standardized are soon reached. Another possibility for greater production through increased subcontracting is limited for the same reason as standardizing is. Extensive subcontracting is not practical under the short-run conditions existing in the scale business. Manufacturers normally subcontract such basic components as ball bearings and electric equipment, but they themselves make most of the specialized parts.

Scale makers will find answers to their questions. They have been finding them for some 5000 years — from the time before 3000 B.C. when the first shoulder-yoke balance was made to the time of now when electronic scales are first being produced commercially.



INDUSTRIAL WEIGHING EQUIPMENT
. . . war can quadruple the need

Go South, Young Man?

"Industry is looking south. The rate of industrial growth in the last decade in the 11 southeastern states was the highest for any geographical area in the U. S." So says Irwin H. Such, editor of STEEL, who spoke at the eighth annual conference of Purchasing Agents of the Southeast in Memphis, Tenn.

He points out that the South has reserves of natural resources which, with available low-cost transportation, will support the expanding steel industry in that region.

Radio-TV Makers Save Metals

Conservation of material and the substitution of less critical metals in the production of radio and television receivers will result in a savings of more than 70,000 tons of metals in 1951, Radio-Television Manufacturers Association reports.

RTMA's estimate is based on a production rate this year 20 per cent lower than the 7.4 million TV sets and 14.5 million radios manufactured in 1950. The savings have been effected through increased efficiency in design and production techniques. RTMA estimates that the radio-TV industry will use 70,353 tons less of aluminum, cadmium, cobalt, copper, lead, nickel, iron and steel, tin and zinc this year than last. The industry's conservation methods would result in savings of 19,774 tons of the scarce metals if production were to equal the 1950 output this year.

Avco Expands Appliance Line

Despite government restrictions on home appliances, Avco Mfg. Corp. soon will expand its appliance line with production of room air conditioners and automatic dishwashers.

On Dec. 18, 1950, the company acquired Bendix Home Appliances Inc. which added a line of automatic washers, driers and ironers. The latest expansion will be the addition of the two new products to the Crosley Division's line which now includes radio and television receivers, freezers, ranges and refrigerators. Current plans call for the home air conditioners to be put on the market next spring. They may be manufactured by Fedders-Quigan Corp., Buffalo. The dishwasher will be manufactured by Crosley.

Auto Output Cut Again

Passenger automobile production permitted for the first quarter of 1952 is only 950,000 units, compared with 1.1 million that could be made from materials allowed for the fourth quarter of 1951 under the Controlled Materials Plan.

This is a 13 per cent cut, much less severe than a 30 per cent cut which government officials had been considering. The heavier slash was ruled out because of fears it would cause substantial unemployment in the automobile industry. The 13 per cent reduction is to permit additional materials to be diverted into defense production, which is on the increase.

Good Plantkeeping

Industry will spend $14 million on floor maintenance equipment this year

GOOD HOUSEKEEPING habits learned by industry in the past ten years mean money in the pockets of floor maintenance equipment producers.

Payoff for industries adopting mechanized floor maintenance lies in lowered maintenance costs, longer wear for preserved surfaces, cleanliness and the orderliness necessary for smooth functioning of today's modern factories and offices.

Credit Due — A big share of credit for increased attention to plant floors lies in development of more efficient multipurpose machinery for the job. Today almost any type of floor can be resurfaced, (ground, sanded, steel-wooled), scrubbed, waxed and polished with one piece of mobile machinery. Some equipment even has integral vacuum units.

Some 100 companies supply industry with floor machines. About 25 of these are the real manufacturers— the remainder are merely assemblers, marketers or those with primary interests in household equipment. Competition is keen in the field; quite a few of the postwar entries have since withdrawn.

Postwar Boom — Government regards the industry as a $10 million business. Industrial and commercial sales alone should amount to over $11 million in 1951. Accessories business has been heavy this year and will add about $2.5 million. Household sales have rocketed too. Including that category, the industry could well represent nearly $20 million in 1951 sales. That would be over four times the prewar volume.

Major parts in a typical floor cleaning-maintenance machine are: Electric motor and controls, reduction gears and shafting, carriage with wheels and handle, housing mechanism for attachment of accessories, rotating brushes or other attachments, and possibly a vacuum unit. Under conditions of peak demand, a lot of these components are subcontracted. Otherwise nearly all of the machine is manufactured within the industry, except for castings and electrical parts. About half as many gears used are produced or cut by the industry as are bought on the outside.

Essential — Regulated by Service Equipment Division of NPA, the industry is sustained by B classification listing of industrial and commercial products. Government thinking is that mechanical cleaning saves manpower and is requisite for sanitation and safety reasons. Army, Navy and Air Force are especially particular about cleanliness in their suppliers' plants.

Nonferrous shortages hamper the industry. Most components are aluminum, brass or bronze. A few gray iron castings are employed. Bronze castings and copper basins for cleaning fluids seem especially tight. Switch to galvanized basins is held up by short supply there too. Stainless steel sheets for housings have been extensively used; future prospects for that product are quite dim. Few ball bearing shortages have been reported to date.

Bigger Breeze at Lewis Lab

Construction is under way for a *supersonic-plus* wind tunnel for the Lewis Flight Propulsion Laboratory, Cleveland. About 1200 representatives of aircraft and aircraft engine companies, government agencies, and educational and scientific institutions learned about it last week at the National Advisory Committee for Aeronautics open house when they met to hear the latest on research trends and new techniques being used at the laboratory.

Drive motors for the new tunnel will add up to 250,000 horsepower and have a one-hour peak overload of 300,000 horsepower. That's three times more powerful than the present system.

The motor capacity for reaching the tornado-peak velocities will come from linking together four 37,500-hp variable speed ac induction motors with one axial flow compressor and three 33,334-hp motors with another compressor. Each motor will weigh 120 tons and measure 14 feet high, 14 feet wide and 25 feet long. The tunnel will be used principally for research in the ramjet, gas-turbine and rocket engine categories. Most recent advances at the 10-year-old laboratory include research in icing, fuel consumption, materials (mostly metals), utilization, cooling of turbojets and increases in the efficiency of after-burners.

New Highs for Aircraft Costs

Higher costs of manufacturing materials, labor, machinery and greater complexity of design, construction, and content — are reasons for the high cost of manufacture of today's military aircraft, says Robert E. Gross, president of Lockheed Aircraft Corp., Burbank, Calif.

Reports Mr. Gross: The 175-million square feet of production capacity that turned out 96,000 airplanes yearly at World War II's peak, is hard put to produce 10,000 to 15,000 of

BUILDING THE WEST: Heavy fabricating is now being done at Bethlehem Pacific Steel Corp.'s Seattle fabricating plant. In the works are two junior high schools for Seattle, a department store for Portland, several highway and railroad bridges and transmission towers for the Bonneville Power Administration and The City of Seattle Light Department. Included in the Bethlehem plant is one of the largest electrically heated galvanizing units in the country. Succeeding tanks from left to right wash, pickle, flux and dry the steel before it enters the galvanizing pot at the far left

the modern, complicated, hard-to-make jet airplanes of today. Today's jet-powered aircraft is much more complicated and costly than World War II's piston-powered model.

Airframe, engine, and propeller costs in 1942 were 85-90 per cent of the cost of the complete airplane. Now they represent only 50 per cent, the difference lying in the cost of the complex, expensive devices and gadgets like automatic fire control systems, tracking apparatus and radar being added to today's fighting aircraft. To design today's airplane, one of each eight employees at Lockheed is an engineer compared with the 1943 figure of one out of 22.

Part of the higher price tag, explained Gross, comes from machinery of new design and larger capacity required to fabricate the tough, thick, load-bearing skins replacing the obsolete thin skins and internal bracing of World War II's piston-powered fighters.

Small Parts Mean Big Business

Subcontracts are being awarded weekly to small plants with limited or specialized facilities for producing one of the hundred-and-one gadgets needed for the giant and complex machines which go to war.

This week a $2 million or more contract was awarded to Vendorlator Mfg. Co., Fresno, Calif., by Douglas Aircraft Co., for the producing of an accessory for an attack plane. This is the first major aircraft subcontract for the Fresno area. Delivery on the accessory is expected to start next March.

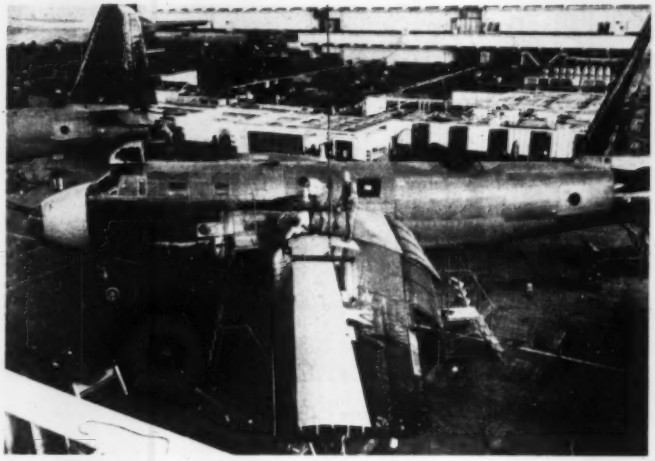
Rugged Lights by Westinghouse

Newest Navy minesweepers will get signal searchlights which are among the most rugged ever constructed.

The lights, which will be produced by Westinghouse Electric Corp.'s Lighting Division, Cleveland, must be able to withstand drops ranging up to 40 feet for the large size (24 inches in diameter) and still continue to operate. Of the 287 lights ordered, 43 will measure 24 inches in diameter and 244 will be 12 inches in diameter.

The 24-inch size is capable of standing up under the impact of a 900-pound weight dropped from a distance of 10 feet, while the 12-inch light can shrug off a 200-pound weight dropped from the same height.

The searchlights will be used for daytime signaling between Navy vessels when radio silence must be maintained.



COORDINATION: Typical example of how today's military aircraft are a product of the whole country, the P2V Neptune navy patrol bomber outerwings are built by Texas Engineering & Mfg. Co. Inc., in Dallas, and shipped some 2000 miles to California by truck for final assembly. Here an outerwing built in Texas is joined with the fuselage of a Neptune bomber at the Lockheed plant in Burbank, Calif.

Aircraft Contracts Continue To Pace the Defense Program

NO LETUP in new defense prime and sub contracts is in sight as announcements of new awards continue this week. The aircraft industry is still shuffling and sharing defense work to get actual production rolling.

Allis-Chalmers Mfg. Co., Milwaukee, for example, received a subcontract to do 90 per cent of the manufacturing operations on the Pratt & Whitney T-34 turbo prop engines. Allis-Chalmers will produce and assemble the gas turbine engines and Pratt & Whitney will test them at their plant in East Hartford, Conn.

Westinghouse Aviation Gas Turbine Division, Philadelphia, announced Navy orders for military jet engines, which represent the largest equipment purchase for any category of machinery in the company's history. The several-million-dollar contracts are for different models of jet engines, including one for the Westinghouse J-40 engine.

On a subcontract, Westinghouse Electrical Appliance Division, Mansfield, O., is producing pylons for use on Republic Aviation Corp.'s F-84 Thunderjet. Pylons are a mechanized connector device attached to the underside of aircraft wings for carrying fuel tanks and armament.

In other than the aircraft field, Northern Ordnance Inc., Minneapolis, has a $30 million prime Navy contract for making a new model 5-inch gun. Also Wayne Pump Co., Ft. Wayne, Ind., has several million dollars in defense contracts to make machine guns and 20 mm shells.

Other contracts awarded by the government, in excess of $250,000, follow:

Product	Contractor
Hydraulic Chucking Machines	National Acme Co., Cleveland
Table Type Boring & Drilling Machines	Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.
Bailey Bridge: Erection Equipment	Marinette Marine Corp., Marinette, Wis.
Steam Tables	Bastian-Blessing Co., Chicago
Pole Handling Trailers	Eagle Mfg. Co., Appleton, Wis.
Ammunition Containers	Cleveland Container Co., Cleveland
Cartridge Cases	Moore Enameling & Mfg. Co., Lafayette, O.
Boosters	Brunner-Ritter Inc., Bridgeport, Conn.
Covered Lighters	Kyle and Co., Fresno, Calif.
Aviation Armament Parts	Ruffe Inc., Miami, Fla.
Tank & Combat Vehicle Parts	Motor Wheel Corp., Lansing, Mich.
Compressor & Pump Repair Parts	Ingersoll-Rand Co., Philadelphia
Small Arms Components	Buffalo Arms Inc., Buffalo
Motor Vehicle Parts	Allen Industries Inc., Detroit
Fin Assembly Motor Shells	Gabriel Co., Cleveland
Rocket Trap and Spacer Assemblies	Wald Industries Inc., Huntingdon, Pa.
Generators	General Electric Co., Schenectady, N. Y.
Signal Generators	Boonton Radio Corp., Boonton, N. J.
Radio Sets	Sentinel Radio Corp., Evanston, Ill.
	Barker & Williamson, Upper Darby, Pa.
	(Dollar Value Not Furnished)
Tank-Automotive Parts	Navi Equipment Co., Navi, Mich.
Slider for Fuze	Landis Machine Co., St. Louis, Mo.
Parts for M1 Rifle	Chillicothe Furniture Co., Chillicothe, Mo.
Percussion Primer	Progressive Service Co., St. Louis, Mo.

CHECKLIST ON CONTROLS

GOVERNMENT control orders are digested or listed each week in this "Checklist on Controls." For complete copies of NPA orders, write to NPA Distribution Section, First Basement, New GAO Bldg., Washington 25. For copies of OPS orders, contact nearest OPS district or regional office. For copies of OPS news releases, write David S. Phillips, director, OPS Administrative Services Division, Temporary E Bldg., Washington 25.

Materials Orders

AMATEUR RADIO—NPA Order M-85, effective Oct. 4, 1951, grants priority assistance to FCC-licensed amateur radio stations and stations used by the Civil Air Patrol in obtaining supplies for maintenance and repair, for capital additions to existing stations and for building new stations.

CANS—Amendment of Oct. 8, 1951, of NPA Order M-25 permits packers of canned goods to choose one base period for one product and another base period for another product in determining the number of cans they are permitted to use.

COPPER WIRE MILL PRODUCTS—NPA Order M-86, effective Oct. 5, 1951, is to provide for maintenance of minimum reasonable inventories by distributors of copper wire mill products.

ELECTRIC EQUIPMENT — Amendment of Oct. 4, 1951, of NPA Order M-44 permits manufacturers to schedule production on new orders for power and electric equipment, provided those orders do not displace or delay approved delivery dates of existing orders. This change eliminates necessity for obtaining specific NPA approval before adding items to order boards.

STEEL DISTRIBUTORS—NPA Order M-6A, issued Oct. 5, 1951, requires steel producers to ship a minimum of 100 per cent of average monthly base period tonnages to warehouse distributors on and after Jan. 1, 1952. Base period is the first nine months of 1950. Required monthly shipment of each steel product now going to warehouses is 85 per cent of average monthly base period shipments. M-6A will supersede M-6 on Jan. 1, 1952, when M-6 will be revoked.

NPA Delegation

USE OF DX SYMBOL—Supplement 2 to NPA Delegation 1 gives the secretary of defense authority to apply the new emergency symbol DX to orders placed by the Defense Department when delay in delivery would jeopardize vital programs of the agency. Similarly, Supplement 1 to NPA Delegation 2 gives such authority to the Atomic Energy Commission's director of construction and supply. These supplements were effective Oct. 4, 1951.

Controlled Materials Plan

FLOOD ASSISTANCE—Amendment of Oct. 8, 1951, of Direction 2 to CMP Reg. 5 and amendment of Oct. 8, 1951, of Direction 2 to CMP Reg. 6 extends for 90 days the time during which owners of buildings damaged during the Midwest floods of last summer may continue to get special priority assistance to obtain materials for reconstruction and repair.

Price Regulations

RESELLERS—Amendment 3 of Ceiling Price Regulation 67 prohibits resellers of machinery and related manufactured goods from using published list prices issued by a manufacturer who has changed his discount structure since June 24, 1950. In such cases the resellers will determine ceiling prices by applying the percentage markup he used during the period of Apr. 1 through June 24, 1950, to the legal cost of the commodities. Amendment 3 was effective Oct. 8, 1951.

MACHINERY MATERIALS—Amendment 17 of Ceiling Price Regulation 30 gives manufacturers who have not already filed their pricing computations an alternate method of computing materials cost adjustments. Amendment 17 was effective Oct. 13, 1951.

USED MACHINE TOOLS — Ceiling Price Regulation 80 provides a new and separate ceiling price regulation for all sales of used machine tools and used machine tool extras. Previously, used machine tools and extras were covered by the General Ceiling Price Regulation. CPR 80 was effective Oct. 13, 1951.

Knock-Down, Drag-Out

A SIMULTANEOUS knock-down with dynamite and tug-of-war by a locomotive will demolish an old blast furnace at the Pueblo, Colo., plant of Colorado Fuel & Iron Corp. this week. A new furnace was constructed on a temporary steel under-structure beside the existing unit and enabled CF&I to keep the old furnace in blast till the last possible moment so no tonnage would be lost.

When ready for demolition, workmen will rip out the brick between the old shell and foundation and replace three of the eight steel supporting columns with timbers inserted with dynamite charges. As the dynamite is detonated the locomotive will pull down the furnace top with the help of steel cables. "The demolition operation will be a lot faster than the conventional method of dismantling a furnace piece by piece," says A. M. Kreiger, president of Affiliated Furnace Inc., Pittsburgh, which is handling the job.

After removal of the old unit, the new 350-ton steel shell and top structure will be skidded to the old foundation 100 feet away. Work will be done by another Pittsburgh concern, Eichleay Corp. The project is expected to be completed in 100 days.

Allotment Symbols Added

Defense Production Administration has made five additions to the list of allotment numbers and symbols and DO symbols which must be used by all federal claimant agencies in authorizing production and construction schedules and in making allotments of controlled materials. The five are:

W-1, for military equipment and supplies being purchased by foreign governments through domestic commercial channels.

W-3, for civilian requirements of foreign areas under military administration.

X-5, for steel products purchased by one steel producer from another for resale without further conversion.

X-6, for brass mill products and wire mill products required by distributors to replenish stocks.

X-7, for aluminum for destructive uses.

More Well Drillings Possible

Petroleum Administration for Defense says 43,900 new oil wells can be drilled this year, not 43,400 as originally estimated. PAD, headed by Oscar Chapman who is also secretary of the interior, says added steel supplies make the extra drillings possible.

Mr. Chapman reports that wildcatting is increasing; wildcat completions are currently running 26 per cent over 1950. But excess crude oil producing capacity, which stood at 1 million barrels a day in mid-1950, now is down to half that figure. Mr. Chapman says the U. S. is not running out of oil. Over the next five years this country "will be able to step up its domestic productive capacity nearly 250,000 barrels a day annually" provided producers get the materials they need.

It is becoming more and more apparent that the 1-million-barrel-daily expansion we have been planning "for completion by the end of 1953" will not give us enough spare capacity, he says.

Here again, materials shortages are the factors that are holding back new construction, he indicates.

Windows of Washington

You can grant salary boosts in some cases without prior approval and without reporting. Here are the rules of the game as outlined by the Office of Salary Stabilization

THE INTERNAL Revenue Department is going to pay close attention to your salary schedules in its next examination of tax returns to nab any violations of existing wage stabilization rules, so watch your step and learn those rules of the game.

Three general salary stabilization regulations have thus far been issued. Copies of those, plus additional regulations and interpretations that may come, can be obtained from the Office of Salary Stabilization.

Outline—Regulation No. 1 deals with 10 per cent increases in salaries and other compensation to correct certain inequities, cost-of-living increases, tandem salary increases and salary schedules for new plants. Reg. No. 2 deals with bonus payments to executive, administrative, professional and outside sales employees. Reg. No. 3 deals with merit or length-of-service increases, new or changed jobs, promotions and transfers to higher paid positions, salaries for new employees, auxiliary pay practices.

All people employed in executive, administrative and professional positions, as well as outside sales personnel, who receive salaries or other compensation and who are not represented by a union are automatically governed by salary stabilization policies. Salaries were frozen Jan. 25, 1951, but increases are possible.

When and How—Provided you as an employer have the salary range method of payment, you can give merit or length-of-service increases without prior approval and without reporting—if you comply with any of these options: Past practice which permits application to the current year of your actual experience in 1950 with a group of employees; the 6-per-cent option which allows you to take 6 per cent of the aggregate base salaries of all employees in a group and grant increases up to that amount; the established plan which permits you to grant merit or services boosts in accordance with an established plan actually operating on Jan. 25, 1951. Where employees are paid through the personal or random method of payment, you can give merit and service raises without approval or reporting if the total amount of such increases

TAKES OVER: Swan Bergstrom, vice president of Cincinnati Milling Machine Co., succeeds Herbert Tigges as director of the NPA Metalworking Equipment Division

combined doesn't exceed 6 per cent of the aggregate base salaries and if the maximum increase granted to any one employee doesn't exceed 10 per cent of his salary. In general, most salary hikes resulting because of promotion may be given without prior approval or reporting.

These types of increases generally do not require prior approval but reports must be filed with the Office of Salary Stabilization: Increases to correct certain inequities; cost-of-living boosts provided by salary plans; increases in a bonus fund.

Prior Approval—In general, you must have prior approval of all increases if you want to go beyond the requirements of the regulations. These actions must always have prior approval: Salary schedules for new plants; new salary plans or modifications of existing salary plans to govern individual increases; increases to restore tandem salary relationships between jobs.

Tough Policy on Construction...

NPA means business in its policy of curtailing nonessential construction.

That was made clear in its action rejecting more than $505 million worth of fourth-quarter construction because of the shortage in steel, copper and aluminum. There's little hope that the agency will let up on its curtailments for a while even though all sponsors of rejected projects may reapply. If they want to be considered for the first quarter, they must reapply immediately.

Intramural Shift on Loans . . .

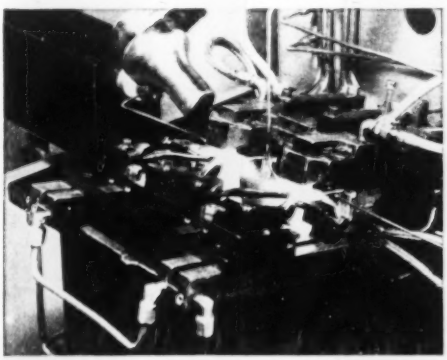
The shift of the Defense Production Administration's authority to approve defense expansion loans to the Reconstruction Finance Corp. is an intramural change. Expect no radical departure from old DPA policies on granting the loans.

As of Aug. 28, DPA had approved 60 such loans amounting to $113,893,029. Under the old setup RFC acted solely as a bank teller, disbursing the money from a $600 million appropriation for the purpose. From now on, all loan applications for domestic facilities should be filed with RFC field offices throughout the country.

RFC will determine terms and conditions of such loans, but they will continue to be made only if neither private funds nor regular RFC funds are available for industrial expansion purposes. DPA will still have a hand in the matter because certificates of essentiality for each loan will now be required from it, or the Department of Agriculture. The loan setup is provided for under Section 302 of the Defense Production Act of 1950.

kraeuter keeps the edge

with flamatic hardening



Flamatic hardening of plier cutters by Kraeuter & Co., Newark, N. J. Process duplicates hardness pattern shown in red above.

To the long list of proven applications for Flamatic hardening (gears, cams, etc., up to 18 inches in diameter . . . spindles up to 36 inches long) you can now make another important addition: **cutting edges.** Here's an interesting case! Cincinnati Flamatic Hardening provides Kraeuter & Co. pliers harder, longer-lasting cutters—routinely, uniformly, economically, and on a high production basis. Operator loads pliers on holding fixture, then merely presses a button. High temperature flames heat selected area of the cutters to specified temperature electronically controlled, then pliers drop into conveyorized oil quench tank . . . For prompt recommendations on how Cincinnati Flamatic hardening may help you, send a sample part or blueprint for analysis.

flamatic

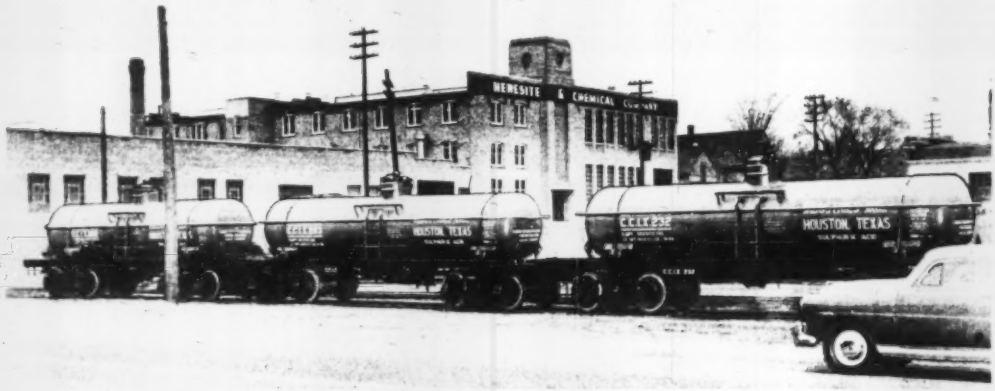
THE CINCINNATI MILLING MACHINE CO.

Cincinnati 9, Ohio, U.S.A. • CINCINNATI

HERESITE

REG. U. S. PAT. OFFICE

LININGS FOR TANK CARS AND TRAILER TANKS

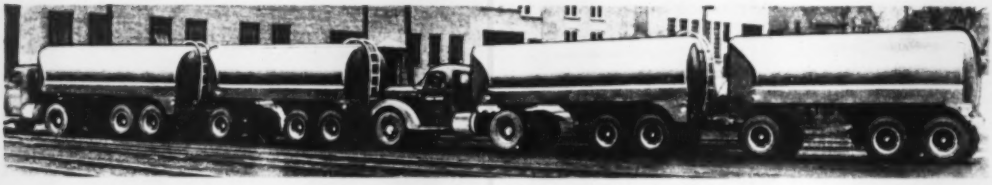


RESISTANCE

Heresite linings effectively prevent product contamination of such items as concentrated Sulphuric Acid, Rubber Latex, Formaldehyde, Lactic Acid, Battery Acid, Acetic Acid, Vinegar, Fruit Juices, and Wine.

EASE OF CLEANING

Heresite lined tank cars are quickly cleaned by Steaming, Hot Water or any type of Solvent wash.



SYNTHETIC RUBBER LINING

The strongest caustic hydroxide solutions, as well as the halogen acids and other chemicals, may be transported in a HERECROL lined tank car or trailer tank.

LITERATURE WILL BE FURNISHED UPON REQUEST

HERESITE & CHEMICAL COMPANY

MANITOWOC, WISCONSIN

Triple-Duty Plants

Plan new and converted plants to produce for war, peace or both, says GM's Wilson

MAKE ROOM in your thinking for a new concept of what a manufacturing plant should be.

Historically, plants in this country have been looked upon as providers for a peacetime economy only. Occasionally they were called upon to do a hitch for the military.

But now that the United States is embarked on a continuing policy of preparedness we have to make guns and butter at the same time. That change in policy necessitates a change in what a manufacturing plant should look like, believes C. E. Wilson, president, General Motors Corp.

Proposal—He suggested to the American Ordnance Association that manufacturers who are expected to assume responsibility for producing the larger and highly technical military items be prepared to operate dual-purpose plants which can be used in three ways: For combined peacetime and defense production, for total war production, or for total civilian production.

This new concept, Mr. Wilson says, avoids formation of a separate war industry, whose interests and employees depend solely on war or defense preparation. Instead, it involves within industry a system of industrial plants which are adaptable with minimum changes and time lag to produce peacetime, wartime or a combination of both types of items.

The Blueprint—Plants were described by Mr. Wilson in which these conditions would be met. Certain facilities and equipment would be common to either type of production: Offices, cafeterias, hospitals, power plants, tool rooms, maintenance departments, railroad sidings, parking lots, etc. A jet engine-automobile stamping plant, for example, would necessarily have certain areas and equipment which would be single purpose, but a large percentage of the space and some of the tools would be used for either type of output. Management employees and production workers, likewise, could be readily transferred from one type of work to the other. New plants and existing ones as they are changed for defense production should be organized with this flexibility, he says.

Partner With Uncle Sam—To accomplish industrialization of the dual-purpose type on a broad scale will require, says Mr. Wilson, definite agreements between industry and the government's defense agencies for its preservation for at least ten years and possibly for several generations. Special legislation may be necessary to enable long-term contracts to be let. As part of the arrangement, when only limited defense production is needed, manufacturers would have the obligation of maintaining pilot lines and of keeping up to date on engineering and manufacturing methods of their defense products.

Needed: A Pattern—A good many plants now being built or converted incorporate elements of Mr. Wilson's concept. A pattern, however, is definitely lacking. In the automotive industry, for example, many special-purpose plants for tanks, aircraft engines, etc., are being built. These in many cases are fully as large as the single-purpose plants built in World War II and left standing idle or converted to dissimilar civilian products immediately after, and quite likely will be utilized only in a limited way after the initial defense needs are met.

Several plants designed for civilian production are being modified in their entirety for the more pressing war work. Examples chosen at random: Oldsmobile's tank gun plant, intended for steel storage and plant engineering shops; Ford's Claycomo, Mo., B-47 wing section plant, intended for car assembly.

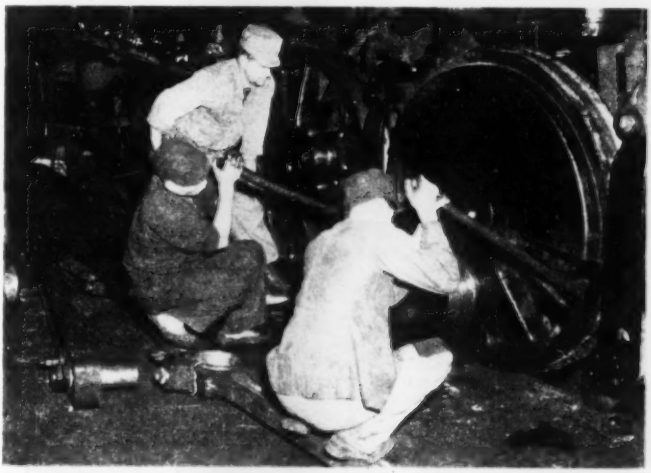
Some Have "New Look"—There are additionally several automotive plants where the dual-role concept is evident. Some of these are component-making facilities, such as Ford's automatic transmission plant at Cincinnati where aircraft lubrication pumps will also be built and Chrysler's Indianapolis transmission plant where parts for the J-48 jet engine will be made. At Flint where Chevrolet's recently announced aircraft engine plant adjoins its car assembly plant, the auxiliary facilities such as the power plant are being expanded for the dual role, and at Plymouth Division's Evansville, Ind., and Kaiser-Frazer's Willow Run aircraft-passenger car assembly plants many of the concept's requirements are being fulfilled.

Certificate Granted for Steel

Hofmann Industries Inc., Sinking Spring, Pa., was granted a government certificate of necessity for accelerated tax amortization on facilities for cold-rolling sheet steel. The certificate would permit the company to make a quick write-off on 60 per cent of $1,064,687 worth of facilities.

Because considerable time elapsed between application for a certificate and granting of it and because materials supply conditions have changed in that interval the company is reappraising the proposition and the advisability of going ahead with it.

Hofmann Industries was formed in 1922, and entered the cold-rolled strip and tubing field in 1937. President of the company is Henry A.



CASEY (G.I.) JONES: Battlefield repairs often are needed to keep trains rolling in combat areas. Here a G. I. railroader and two helpers work on the drive wheels of a steam locomotive in Korea, where railroads have proved to be a principal means of supporting our troops. Transportation Corps railroad repairmen get on-the-job training in the yards and shops of private companies and 12 weeks of specialized railroad training at Fort Eustis, Va., before tackling problems in battle zones

Hofmann. The company has an annual capacity of 24,000 net tons of cold-rolled strip, 600 tons of electric-weld tubing, and 600 tons of mechanical tubing.

Sinking Spring is near Reading.

Newport To Start Expansion

Work is to start immediately on a $22,460,300 expansion and rehabilitation program by Newport Steel Corp., Newport, Ky. The company received government permission to amortize the project over a five-year period.

The project calls for new buildings, electric furnaces, continuous pickling line, cold reduction mill, barge unloading equipment and other facilities at its Newport works, as well as rehabilitation, at an estimated cost of $333,000, of the company's blast furnace at Martins Ferry, O.

Mechanized Research

Some 35,000 items of scientific apparatus help pace the nation's progress

MECHANIZATION and specialization of industry and science are making them more and more dependent on scientific apparatus and a galaxy of related equipment.

Little of this equipment is commonplace to the layman because of its size and highly technical usage, but more than 35,000 products are manufactured by the scientific apparatus industry. During World War II, the industry estimates it supplied over 30,000 different items for the Armed Forces alone.

Role of Metalworking—Seven main classifications of scientific instruments are: Laboratory apparatus (including reagent chemicals, glassware and some laboratory instruments); optical instruments; industrial instruments (including testing and measuring instruments); recorder-controller instruments; laboratory equipment (including furniture); nautical, aeronautical and military instruments (including munitions components and equipment); and surveying and drafting instruments.

At least 1500 companies are engaged in manufacture of one or more items under these classifications. Total sales volume was close to $140 million in 1950, exclusive of the recorder-controller classification, which too has a large volume. Based on first half figures, 1951 sales will be up about 45 per cent. The trend is upward because of the defense program: One-third to one-half of present output is earmarked for defense and defense support. For some items, the figure is close to 75 per cent.

Wherewithal—The industry has essential rating under NPA Order M-71 and benefit of priorities. Like many another industry classed as essential it is nevertheless having trouble finding sufficient critical materials, notably copper, brass, nickel, chromium, aluminum and tungsten. In some instances stainless steel is pinching too. Low fourth-quarter allotments are expected to force cutbacks generally. Manpower shortages aren't limiting output yet, but lack of engineers and skilled instrument makers may be a deterrent before long.

Largest single buyer of scientific apparatus and instruments is the federal government and its agencies, including the Atomic Energy Commission.

The important private customers include petroleum, chemical, drug, metals and processing industries; public utilities; educational and research institutions; hospitals and clinical laboratories.

Problems and Solutions—Increased imports from Europe are hurting the industry. This is particularly true of optical instruments. Prices of foreign-made equipment are lower than for domestic, and supply is more plentiful. Availability and prompt delivery caused the Armed Forces to buy abroad in substantial volume.

Best answer to this competition is development of new and better equipment. Among recent innovations are electronic devices for control of analytical determinations, high-frequency electric current for chemical analysis, automatic distillation outfits for petroleum and many others. Aim of the industry is to develop equipment that will make processes fully automatic or as close to it as possible, saving time, effort and possible errors of technicians using it.

AGMA SECRETARY: John C. Sears was appointed executive secretary of the American Gear Manufacturers Association, Pittsburgh, effective Oct. 1. He replaces Newbold C. Goin. Mr. Sears has management experience in several industries, among them: Aircraft, steel, electronics. For the last six years he was resident staff member of American Associated Consultants Inc. and manager of the Cooperative Wage Bureau maintained in Pittsburgh by the steel industry for the development and application of the "Fair Day's Work for a Fair Day's Pay" program

Scrap: Look for It Anywhere

Widespread and active support of the NPA scrap program has turned up scrap in some unexpected places. While railroads and industrial plants are common sources, recent drives brought dormant scrap out of department stores, small towns, and motion picture studios.

Gimbel's Philadelphia department store came up with 450 tons of heavy dormant scrap.

Galion, O., a city of less than 10,000 people, produced, with the help of nine plants in the immediate area, a total of 200 tons of heavy industrial scrap.

Five major Hollywood motion picture studios have sent to dealers 100 tons of iron and steel scrap.

Western Union pulled 17,000 feet of dormant copper tubing from a conduit abandoned more than 20 years ago when the telegraph offices in Richmond, Va., were moved.

The NPA scrap drive, through 3000 county committees of the Department of Agriculture, will go "down on the farm" this fall to harvest worn-out tractors, rusted machinery, plows, cultivators, haying and threshing equipment, broken tools and anvils, old mills and water towers.

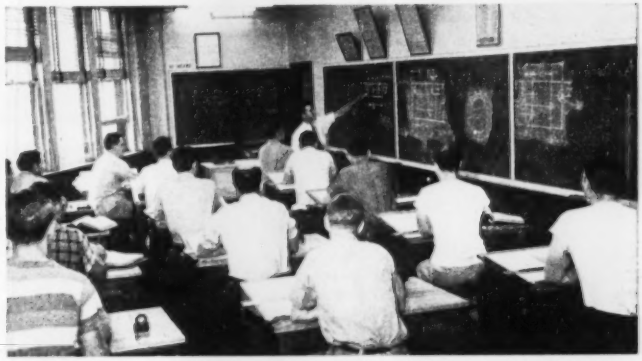
While regular contributors remain the backbone of any scrap drive, NPA is looking hopefully for less obvious sources of scrap in order to reach its goal of 36 million tons.

Freight Cars Are Rolling

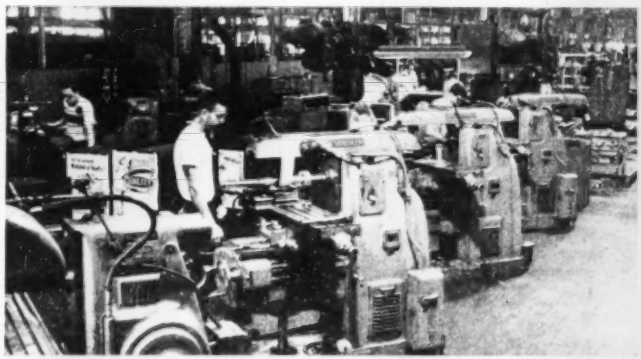
Delivery of 8533 new domestic freight cars in September will help ease a fourth-quarter transportation pinch. Production didn't make up for new orders though: Orders for 9657 new cars raised backlog to 140,135.

Training Machinists: You Can Be Sure If You Follow Westinghouse Formula

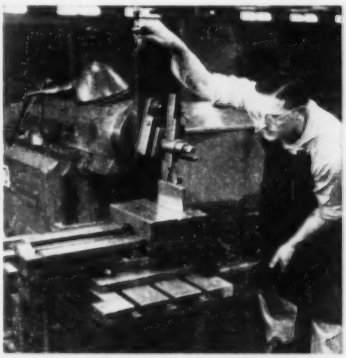
VITAL asset of good machinist is hand-mind co-ordination. Westinghouse apprentices must do well on manual manipulation, mechanical comprehension tests.



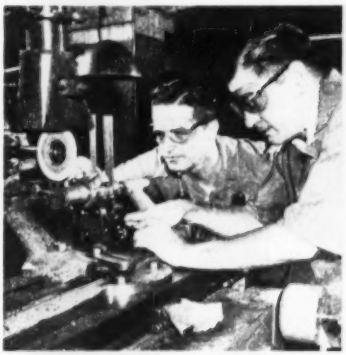
BESIDES operating machines, trainees learn how to design and build new machines to do specific jobs. Course in tool, die and machine design is a must for them. Up to eight hours a week are spent in classroom study of shop theory, chemistry of materials, industrial economics, mathematics and physics.



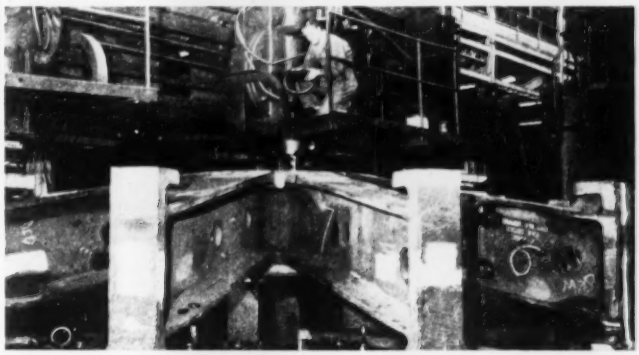
DISCARDING the old theory that apprentices should learn the trade by serving as chore boys for experienced machinists, Westinghouse puts trainees to work right away producing actual parts of some machine or equipment. At their disposal is such modern machinery as these universal milling machines.



SIMPLE jobs, like this routine operation on a shaping machine, are on the initial training schedule. Trainees wear glasses and learn important safe working methods.



INTRICACIES of modern machinery are learned from certified instructors in each craft. This pupil learns to line up wheel to grind proper rake on a milling cutter.

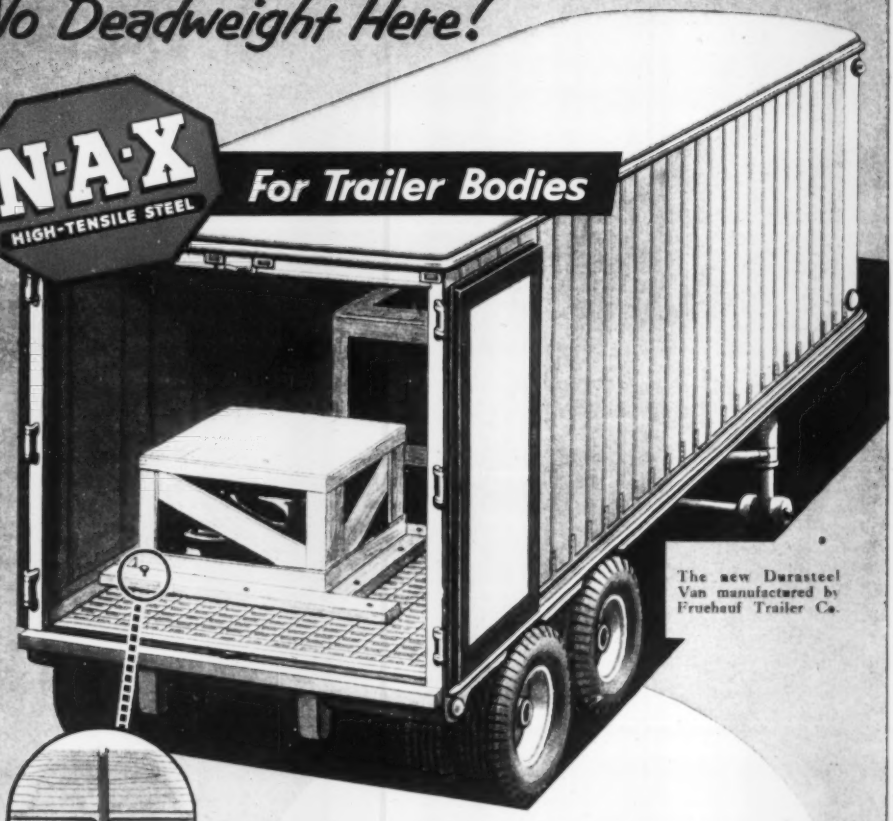


BASIC assignments completed, the apprentice moves on to the shop for further practical training. Putting his experience to a test, trainee operates a huge vertical boring mill to cut the spider for a water-wheel generator to specified size. Setting up machine for this operation usually requires two work shifts.

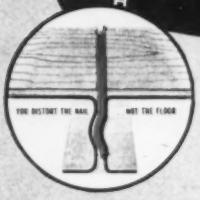
No Deadweight Here!

N-A-X
HIGH-TENSILE STEEL

For Trailer Bodies



The new Durasteel Van manufactured by Fruehauf Trailer Co.



*Great Lakes Strun-Steel Flooring has high strength and light weight. Its unique nailability permits safe blocking of loads. You distort the nail . . . not the floor.

America's first all-steel trailer body is on the highways—roof, sides, framing and flooring, all of N-A-X HIGH-TENSILE steel. Years of planning, testing and research went into this unique trailer body, making it the most serviceable ever built.

1. The use of N-A-X HIGH-TENSILE steel in this equipment results in light weight with strength and durability.
2. In addition to greater strength, N-A-X HIGH-TENSILE steel has greater resistance to fatigue, impact, corrosion and abrasion. It offers a greater strength-to-weight ratio with longer life and larger payloads.

More and more of America's highway equipment manufacturers are swinging to N-A-X HIGH-TENSILE steel. Millions of on-the-job miles have proved the superior qualities of this steel . . . have proved its over-all economy.

GREAT LAKES STEEL CORPORATION
N-A-X Alloy Division • Ecorse, Detroit 29, Michigan

NATIONAL STEEL CORPORATION

It's your SCRAP that makes your STEEL . . . Keep it moving to your scrap dealer

By H. C. TUTTLE *Detroit Editor*

Mirrors of Motordom

Even though a rough winter looms for Detroit's automotive employees the unions appear to be more interested in winning on "principles" than in keeping men employed

DETROIT

ROUGH SLEDDING for Detroit's automotive work-force seems certain this winter. The outlook, as described by labor department, industrial relations and production men, is unusually "iffy." The big "ifs" relate to labor restiveness, materials shortages and defense production.

On the face of the situation as it is today, organized labor should be completely occupied with holding down the jobs they have. Now, it seems to veteran personnel men, is no time for disputes over principles. Washington authorities guess that about 95,000 workers in metropolitan Detroit will be unemployed at the end of the year. If car production, however, can't struggle above the one-million-unit level for the quarter, possibly as many as 115,000 will be jobless.

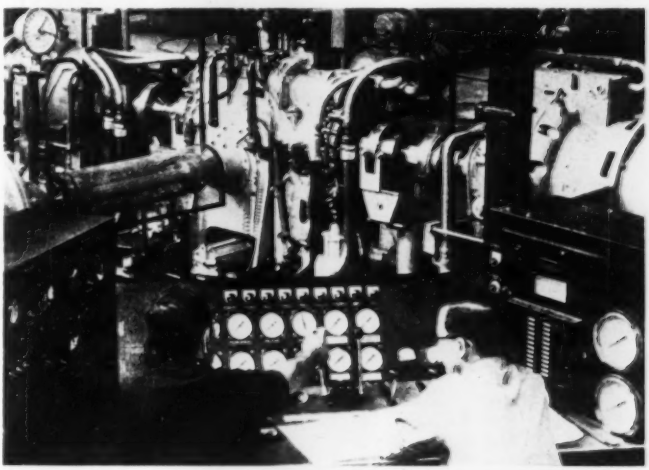
What Price Principles?—And yet looking at the issues which are in dispute laborwise around this city, many seem to indicate that winning their way on principles is much more important to union men than the number on the streets. Carboloy's trouble is a reasonably good example. Here the question is whether the company can move any of its operations without offering to transfer the employees whose job or machine is being moved. Another is the Borg-Warner dispute over whether a national agreement will be negotiated for all B-W plants, rather than separate contracts for each. A disturbance, revolving around the fundamentals of production standards, is also keeping Chrysler operations on thin ice. Unanimous approval of the policy against "speed-ups" was voted by UAW's National Chrysler Conference, and President Walter Reuther and Norman Matthews, UAW Chrysler department director, promised the international union would promptly authorize strike action for Chrysler locals, provided they follow grievance procedure carefully.

They Want It Too—More easily understood are strikes over purely economic issues, such as that which last week closed down 62 pattern shops in the Detroit area. Called by the Detroit Pattern Makers Association, AFL, its 720 members are seeking the 15-cent hourly wage increase, six paid holidays, dependency insurance and full retroactivity which 16 pattern shops not members of the two employer associations involved granted recently. Almost comprehensible, too, is the planned shutdown of some important construction work in Flint, notably at the Grand Blanc tank arsenal, from Nov. 15 to Dec. 1 to allow the workmen to indulge their deer hunting proclivity.

Facts and Figures on Autos

The usual wealth of statistical data contained in "Automobile Facts and Figures" published each year by the Automobile Manufacturers Association, Detroit, makes it a "must" reference work for everyone connected with the industry. Particularly significant in this year's edition, just published, are the figures relating to car essentiality. Featured is a comprehensive survey of passenger car use in the United States which shows that during an average week 73 per cent of the nation's private automobiles are used for getting to and from work, conducting business, or doing work on the farm. Twenty-two million cars are so used each week; 16 million are used for the weekly marketing. Some 27.5 million people use cars daily in earning a living. More than 28 per cent of adults living in households which do not own cars nevertheless ride in cars every day.

A Book of Records—Among the other spectacular items reported by AMA were records established last year by the automotive industry. Well known, of course, is the fact that United States passenger car output reached an alltime high of 6,665,863 units and that this carried



TORQUE FOR TANKS: Operating on the same torque converter principle as Buick's Dynaflow, the CD-850 tank transmission is now in production at the Buick Motor Division plant in Flint, Mich. Engineers watch as a transmission undergoes the 90-minute run on the test-block required before it can be accepted by the government

(Material in this department is protected by copyright and its use in any form without permission is prohibited)

the total U. S. production of passenger cars, motor trucks and busses onto new high ground at 8,003,045. Registrations of all three classes of vehicles were at alltime peaks. Additionally, gasoline consumption in 1950 established a record, as did vehicle mileage driven, special taxes on all motor vehicles and on motor trucks alone.

Since the passenger car, along with bathtubs and telephone, is often used to symbolize the American way of life the tally in "Facts and Figures" of world production of motor vehicles is especially interesting. United States last year produced 76 per cent of the world's turn-out. The combined U. S. and Canadian total of 8,393,881 motor vehicles far exceeded the rest of the world's production of 2,183,545 units. Aside from the United States, the five leading producers and their output were . . . United Kingdom 785,217, U.S.S.R. 500,000, Canada 390,836, France 357,552, and West Germany 304,930. The estimated breakdown of Russian output by AMA is enlightening. Of its 500,000 vehicles, only 75,000 were passenger cars, far below a week's production for U. S. factories. Its estimated truck output of 420,000 was, however, about a third of ours, and its bus production at 5000 units was greater than were made in the U. S. last year.

Startling — Comparison of 1950 world output with 1938's figures also contains a startling picture of growth for these two countries. The United States in that prewar year built 2,489,085 vehicles, the Soviets produced 210,731. Other countries whose production more than doubled are Canada, Czechoslovakia, Finland, Hungary, and Sweden.

Though the second exporter of cars and trucks, the United States did not hold a candle to Great Britain in this regard. Total U. K. exports last year were 542,860 vehicles, of which 398,302 were passenger cars and 144,558 were trucks. The U. S. exported 251,662 vehicles, comprising 120,285 cars and 131,377 trucks and busses.

Trends—Some interesting trends in body styles of passenger cars are evident from a comparison of the percentage of the various types to total sales in 1940 and 1950. Most spectacular gain in popularity is, of course, recorded in the so-called "hard-tops." Unknown in 1940, these accounted for only 0.2 of one per cent in 1949, but by 1950 made up 4 per cent of factory sales. Station wagons, too, became more important, rising from 0.7 per cent in 1940 to 1.8 per cent in 1949 and 2.1 per cent last year. Convertibles suffered: from 2.8 per cent of total in 1940 they rose to 4.2 per cent in 1949, then slipped back to 3.1 per cent in 1950. Four-door sedans, which accounted for 42 per cent in 1940 and 49 per cent in 1949, made up 48 per cent of factory sales in 1950. Two-door coaches and coupes, overwhelmingly popular at 54 per cent in 1940, receded to 44 per cent in 1949 and to 42 per cent last year.

A noteworthy feature of the book is a table listing several defense products to be produced by members of the automotive industry, and the number of subcontractors required for each of these items. A prime contractor of cannon, for example, reports that of 769 parts which the gun requires 757 or 98 per cent will be furnished by subcontractors. An aircraft engine, requiring 2000 parts, will have 1800 or 90 per cent supplied by 1370 separate subcontractors.

Auto, Truck Output

U. S. and Canada

	1951	1950
January	645,688	609,879
February	658,918	505,593
March	802,737	610,680
April	680,281	585,705
May	695,898	732,161
June	653,682	897,853
Six Mos.	4,137,204	3,941,878
July	522,858	746,801
August	571,442	842,335
September	491,608*	760,847
October		796,010
November		833,784
December		671,622
Week Ended	**1951**	**1950**
Sept. 15	136,150	185,421
Sept. 22	135,015	188,451
Sept. 29	113,973	187,030
Oct. 6	114,468	174,234
Oct. 13	125,000*	174,234

Sources: Automotive Manufacturers Association, Ward's Automotive Reports. *Preliminary.

The "Muddle" Age

Registered in the United States last year were 49,176,796 motor vehicles, exclusive of military conveyances. A cause for considerable concern among automotive manutures is this question: How many more will be too many? Kicking off a concerted drive to impress upon the public the close-to-saturated condition of the present highway system, General Motors last week inaugurated a two-pronged campaign. Its program consists of a new movie and a booklet, both entitled "Let's Get Out of the Muddle," being made available through GM's dealer and field organization. Albert Bradley, GM executive vice president, and chairman of the National Highway Users Conference, points out in the introduction this warning . . . "We may think we sell cars and trucks—what we are really selling is mobility. Our cars and trucks must be well designed and well built, but if they cannot be used efficiently and enjoyably, they will be of no more value than a canoe in the desert."

Backsliding—Says Mr. Bradley . . . "We are not even standing still. Actually we are slipping backwards. Our highways are not only becoming more and more obsolete—they are also wearing out faster than they are being repaired. Highway congestion and highway accidents are steadily increasing." Causes of the highway "muddle," described in the movie and booklet, are: Much of existing highway milleage is dying of old age, roads built during the boom "20s" had planned life expectancy of 15-30 years, their number is up. Roads were permitted to go to pot during the war, more that $1 billion was spent last year "in a desperate effort" to keep existing roads from further deterioration. The 1941 highway construction dollar is cut about 50 cents in value because of inflation, new appropriations do not offset this so that today's road construction spending is actually buying less than prewar. Greatly increased traffic is wearing out and obsoleting highways at a faster rate than ever before. Few highways have been built in anticipation of the growth in automotive traffic. Highway tax funds often are spent for other purposes, or if for roads, often on unjustified projects.

The only certain solution to the problem, the GM message says, is "more money spent — but spent wisely."

Cut Production Costs

LATROBE

DESEGATIZED BRAND

HIGH SPEED STEELS
HI CARBON – HI CHROME DIE STEELS

✻ FULL UNIFORMITY

✻ QUALITY CONTROL

CAREFUL SELECTION OF RAW MATERIALS

CONSISTENT MELTING PROCESSES

ACCURATE FINISHING STANDARDS

RIGID INSPECTION PRACTICES

Latrobe's Desegatized Brand high speed steels and hi carbon - hi chrome die steels will help you cut production costs. Rigorous quality control - from material selection through product inspection - plus the full uniformity found in all Desegatized Brand steels assures better tool and die performance and longer production life.

In Desegatized Brand steels, the all-important carbide particles are evenly distributed throughout the entire cross section - NO HARMFUL CARBIDE SEGREGATES ARE PRESENT! This results in extra toughness and strength . . . cracks, checks and warpage in heat treatment are radically minimized . . . superior machining and grinding abilities result.

Specify Latrobe's Desegatized Brand tool and die steels for better performance and resulting lower production costs.

Send for booklet "WHY DESEGATIZED" showing superiority of Desegatized Brand steels over average standard process steels.

LATROBE ELECTRIC STEEL COMPANY
LATROBE, PENNSYLVANIA

Branch Offices and Warehouses located in: DETROIT, TOLEDO, DAYTON, PITTSBURGH, LOS ANGELES, PHILADELPHIA, CHICAGO, CLEVELAND, NEW YORK, BOSTON, SEATTLE, MILWAUKEE, HARTFORD, ST. LOUIS, BUFFALO.

Sales Agents: DALLAS, HOUSTON, WICHITA, DENVER, BIRMINGHAM.

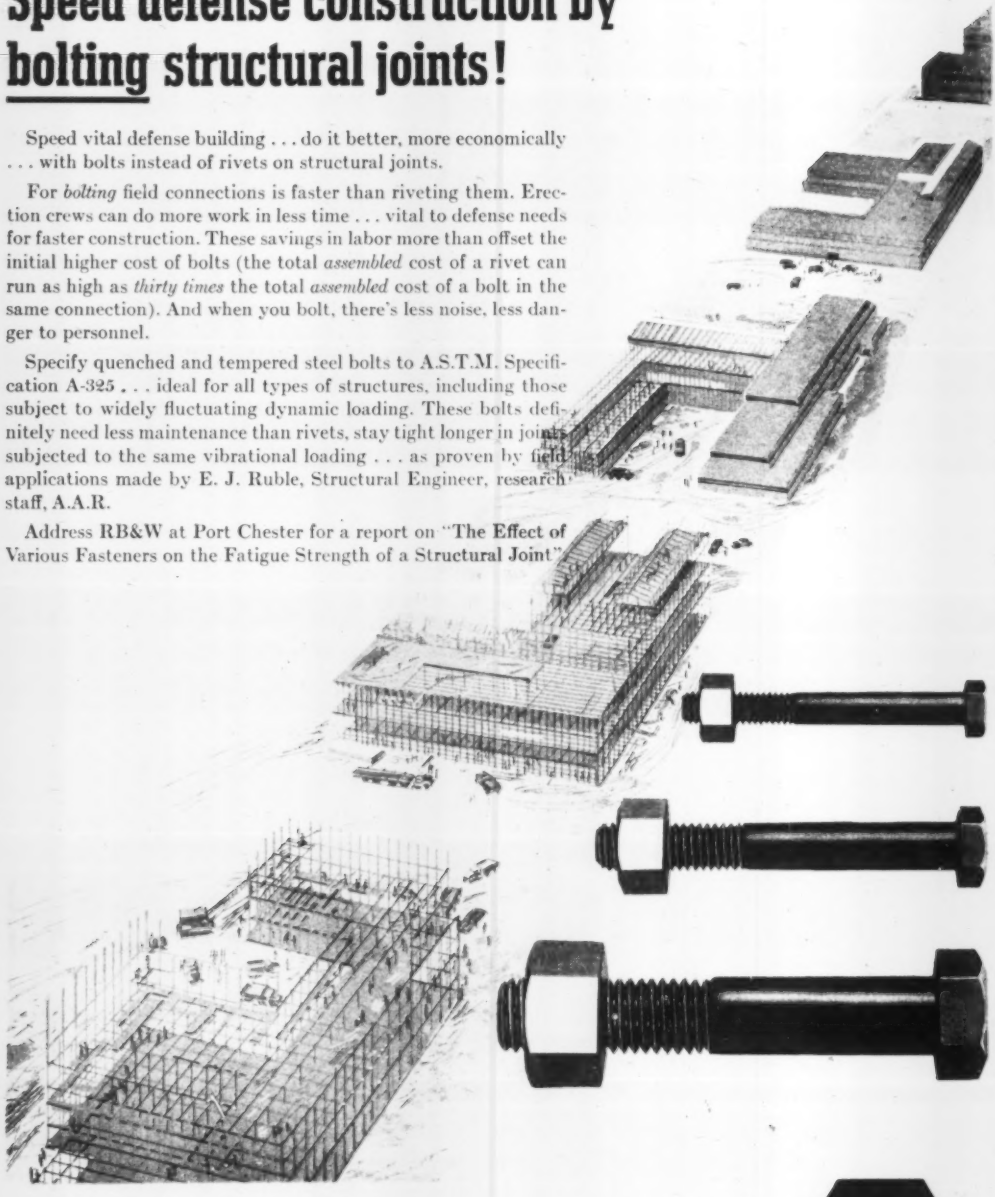
Speed defense construction by bolting structural joints!

Speed vital defense building . . . do it better, more economically . . . with bolts instead of rivets on structural joints.

For *bolting* field connections is faster than riveting them. Erection crews can do more work in less time . . . vital to defense needs for faster construction. These savings in labor more than offset the initial higher cost of bolts (the total *assembled* cost of a rivet can run as high as *thirty times* the total *assembled* cost of a bolt in the same connection). And when you bolt, there's less noise, less danger to personnel.

Specify quenched and tempered steel bolts to A.S.T.M. Specification A-325 . . . ideal for all types of structures, including those subject to widely fluctuating dynamic loading. These bolts definitely need less maintenance than rivets, stay tight longer in joints subjected to the same vibrational loading . . . as proven by field applications made by E. J. Ruble, Structural Engineer, research staff, A.A.R.

Address RB&W at Port Chester for a report on "**The Effect of Various Fasteners on the Fatigue Strength of a Structural Joint**".



RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

Plants at: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Calif. Additional sales offices at: Philadelphia, Detroit, Chicago, Dallas, Oakland. Sales agents at: Portland, Seattle.

RB&W
THE COMPLETE QUALITY LINE

106 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

The Business Trend

Drop in consumer goods production before start of volume outpouring of defense materiel causes lag in industrial production index

TROUGH in the economic sea isn't as narrow as was once supposed.

Last big production wave (final surge of consumer goods was primarily responsible) reached its crest in March and subsided in early summer. Next wave—outpouring of arms—was scheduled to make its debut in September. It hasn't materialized yet.

Duration, not depth of the slack is now causing concern. Industrial production for September, seasonally adjusted, remained at 218 per cent of the 1935-1939 average, say preliminary reports of the Federal Reserve Board. Revisions may bring this estimate up one or two points. Experts are predicting an FRB index well over 230 throughout 1952, with October generally regarded as the jump-off month in its climb.

October so far shows no sign of pickup. Each week sees some disappointment in raising STEEL's index of industrial production. In the week ended Oct. 6, the depressant again was low automobile assembly rates. That component held the index to 212 per cent of the 1936-1939 average, same as the mark recorded the week before. If auto output were near last fall's level, the index would be setting a new weekly record.

Fewer Autos, More Trucks . . .

Doldrums in Detroit, responsible for the downward pressure on the activity index, aren't being chased fast enough by arms orders. Automobile assemblies in the motor capital are at a snail's pace, compared to last year's rate. Slightly higher production was foreseen after the week ended Oct. 6, when 114,468 passenger cars and trucks were completed by U. S. and Canadian plants. Reason is that inventory taking by major producers is now over. Even with the materials noose being tightened in the fourth quarter, over 1 million passenger cars will be built yet this year. Truck production is still higher than in record-setting 1950. Canadian operations are well ahead of 1950 in respect to both cars and trucks. Consensus on 1952 is that unit-wise it will be the poorest year since 1948 but still one of the five best in the industry's history.

Steel Pouring Rate Dips . . .

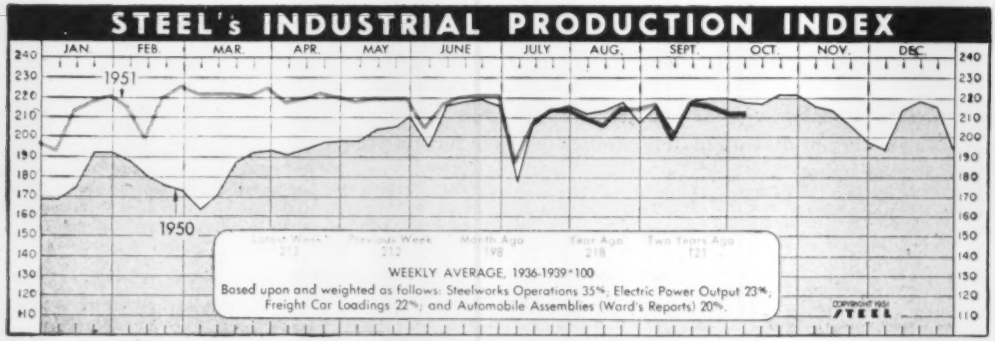
Unprecedented outpouring of steel in 1951 has done little to relieve the extremely tight supply situation yet—even under CMP. Beneficial effects of added production capacity are being threatened by low stockpiles of melting scrap, which may curtail operations somewhat this winter. Mills are still operating above capacity though: In the week ended Oct. 11, they were scheduled to produce 2,035,000 net tons of ingots and casting steel. Drop of 16,000 net tons from the week before represents lost working time because of labor tie-ups rather than lack of scrap.

Plant Awards Rocket . . .

Hiatus of industrial construction is over. Weekly industrial awards in mid-September amounted to only $15 million—about 20 per cent of the

BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	101.0	101.5	99.0	101.5
	Electric Power Distributed (million kilowatt hours)	7,156	7,102	6,795	6,514
	Bituminous Coal Production (daily av.—1000 tons)	1,842	1,817	1,756	1,935
	Petroleum Production (daily av.—1000 bbl.)	6,310	6,303	6,278	5,872
	Construction Volume (ENR—Unit $1,000,000)	$421.9	$335.1	$160.5	$288.0
	Automobile and Truck Output (Ward's number units)	114,468	113,973	103,224	177,853
	*Dates on request. †Weekly capacities, net tons: 1951, 1,999,035; 1st half 1950, 1,908,268; 2nd half 1950, 1,928,721.				
TRADE	Freight Car Loadings (unit—1000 cars)	870†	865	733	864
	Business Failures (Dun & Bradstreet, number)	133	154	116	154
	Currency in Circulation (in millions of dollars)†‡	$28,320	$28,137	$28,262	$27,188
	Department Store Sales (changes from like wk. a yr. ago)‡	+2%	0%	−2%	+6%
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$17,497	$17,125	$12,043	$17,035
	Federal Gross Debt (billions)	$257.2	$257.1	$256.8	$256.4
	Bond Volume, NYSE (millions)	$15.9	$13.2	$12.4	$23.9
	Stocks Sales, NYSE (thousands of shares)	10,231	7,834	7,453	13,426
	Loans and Investments (billions)†	$71.4	$71.6	$70.5	$68.8
	United States Gov't. Obligations Held (millions)†	$31,212	$31,333	$30,930	$33,845
	†Member banks, Federal Reserve System.				
PRICES	STEEL's Weighted Finished Steel Price Index††	171.92	171.92	171.92	157.28
	STEEL's Nonferrous Metal Price Index‡	224.6	224.6	224.6	223.1
	All Commodities†	177.2	176.7	176.8	169.2
	Metals and Metal Products†	190.0	190.5	188.2	177.8
	†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.				


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1951
1950
WEEKLY AVERAGE, 1936-1939=100
Based upon and weighted as follows: Steelworks Operations 35%, Electric Power Output 23%, Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.
COPYRIGHT 1951 STEEL

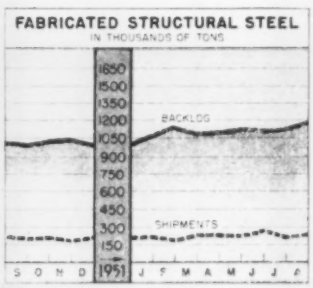
Week ended Oct. 6

year's weekly average. In the two successive weeks they snapped back all the way, registering marks of $190 million and $219 million. The latter figure is largest dollar volume awarded by industry for plants since February, and puts industrial awards for the first 40 weeks of 1951 up 182 per cent over the same period of 1950.

Slowdown of building activity in September is shown in Commerce Department figures. Industrial, military and public housing continued to expand, but total building—$2.8 billion was put in place—was 1 per cent below August and September, 1950. Private outlays of $1860 million were off 2 per cent from August and 11 per cent from a year ago. Private home building appears to have been stabilized for the time being at about two-thirds of the 1950 record level. Another wave of business expansion projects is likely to materialize before cold weather sets in. Reason: The 60-day freeze on allotment of defense necessity certificates will expire soon.

Coal Supply: 66 Days . . .

Entering its busiest season of the year, industry isn't having to worry about coal supplies yet. Stocks on hand in September amounted to 75,414,000 net tons, enough to last 66 days at current rates of consumption. Industrial stockpiles in September were 30 per cent higher than a year earlier, but retail dealer stocks were nearly 20 per cent lower. Total consumption through the summer months this year was slightly below the 1950 level. Exports of coal are climbing rapidly, and the government will allocate and license exports beginning Nov. 1 to smooth the flow from jammed port facilities. Increase in coal prices to allow for higher freight costs isn't expected to hurt sales appreciably. Supply problems in natural gas have slowed down further expansion of that fuel in the home heating field, and gas-fired cen-

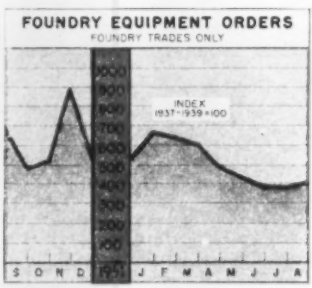


Fabricated Structural Steel

Thousands of Net Tons

	Shipments 1951	Shipments 1950	Backlog 1951	Backlog 1950
Jan.	214.0	154.7	1,067	756
Feb.	193.6	140.8	1,143	780
Mar.	237.1	180.2	1,088	762
Apr.	234.1	187.8	1,093	727
May	224.5	164.8	1,121	785
June	257.1	202.4	1,111	781
July	260.7	165.5	1,135	920
Aug.	240.1	218.3	1,184	1,089
Sept.		198.7		993
Oct.		211.8		1,018
Nov.		193.8		1,034
Dec.		212.9		1,007
Total		2,270.9		

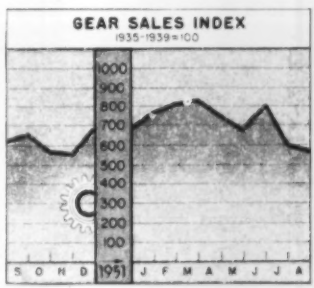
American Institute of Steel Construction



Foundry Equipment

	Index 1951	Index 1950	Value in Thousands 1951	Value in Thousands 1950
Jan.	668.0	150.3	$3,075	$731
Feb.	638.6	113.1	2,940	519
Mar.	599.0	225.2	2,758	1,034
Apr.	490.1	160.6	2,256	737
May	431.7	294.9	1,987	1,353
June	393.2	622.7	1,810	2,858
July	390.3	401.8	1,797	1,844
Aug.	404.5	693.6	1,862	3,183
Sept.		483.8		2,220
Oct.		526.8		2,417
Nov.		885.5		4,077
Dec.		526.2		2,412

Foundry Equipment Mfrs. Assoc



Gear Sales Index

1935—1939=100

	1951	1950	1949
January	764.6	280.2	320.7
February	809.1	272.9	282.3
March	820.7	358.4	299.1
April	742.5	328.6	339.0
May	667.1	363.1	250.1
June	880.9	401.0	227.8
July	589.1	410.7	193.1
August	564.2	617.4	262.0
September		634.5	224.9
October		564.8	242.3
November		554.9	230.7
December		680.4	242.8

American Gear Mfrs. Association

Charts—Copyright 1951, STEEL

tral heating equipment shipments are about half of last year's. Conversions to coal in the last six months are on a scale higher than at any time since the war, says Appalachian Coals Inc., coal marketers.

More Durables On Order Books...

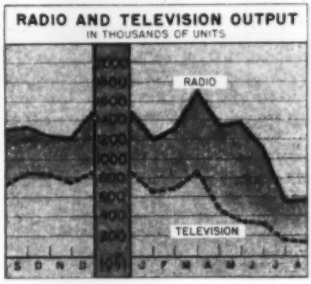
A reflection of near-term business can be seen in manufacturers' orders of several months previous. According to these figures for August, there is no cause for concern about the present. Manufacturers' shipments and new orders both expanded more than seasonally during August, says Office of Business Economics. The pickup was widespread among manufacturing industries. Orders continued to exceed shipments for the durable-goods group and remained below shipments for the nondurables. Durables accounted for the entire $500 million increase in manufacturing inventories. New orders for durables outran sales by $500 million. Advances in book values of machinery producers' inventories and other working stocks accounted largely for the inventory advance. Total unfilled orders going into September remained at the July figure of $55.6 billion.

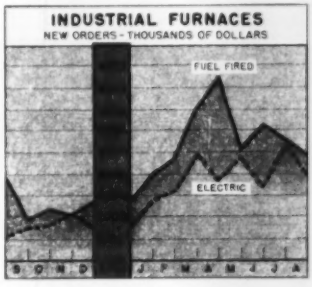
Trends Fore and Aft . . .

Electric power output set a record in August and should reach new highs this fall. . .Defense industries still don't have enough workers; the big pinch in skilled workers is yet to come. . .Highest paid industrial workers of any major category are the 400,000 bituminous coal miners who average close to $2.25 per hour. . . Department store sales finally surpassed year-ago dollar volume figures in the last week of September. . .Big pickup in home furnishings and appliances sales before Christmas is being forecast. . .Railroad net income in August was $55 million, compared to $96 million a year earlier. . .Seven cents out of each dollar received by consumers this year will be saved. That's two cents more than last year, but well under the 24 cents saved in 1944. . .Wholesale prices moved up for the second straight period in the week ended Oct. 2.

Issue Dates of other FACTS and FIGURES Published by STEEL:

Construction Sept.24	Ironers Sept.17	Refrigerators Oct.1
Durable Goods Oct.8	Machine Tools Oct.8	Steel Castings Sept.10
Employ., Metalwk...July16	Malleable Castings Sept.10	Steel Forgings Aug.20
Employ., Steel.....Oct.8	Prices Oct.1	Steel Shipments....Aug.27
Freight Cars Sept.24	Pumps, New Orders..July9	Vacuum Cleaners....Oct.1
Furnaces, W. Air..Sept.17	Purchasing Power ...Oct.8	Wages, Metalwkg...Aug.13
Gray Iron Castings Sept.10	Ranges, Elec. Sept.24	Washers Sept.17
Indus. Production....Oct.1	Ranges, Gas Sept.24	Water Heaters Oct.1





Radio and Television Output

Thousands of Units

	Radio		Television	
	1951	1950	1951	1950
Jan.	1,203	935	646	439
Feb.	1,313	1,069	679	480
Mar.	1,720	1,340	875	687
Apr.	1,337	1,264	460	543
May	1,373	1,245	339	486
June	1,083	1,491	327	502
July	548	666	152	327
Aug.	563	1,304	147	721
Sept.	...	1,335	...	844
Oct.	...	1,230	...	838
Nov.	...	1,216	...	739
Dec.	...	1,506	...	858
Total	...	14,590	...	7,464

Radio-Television Mfrs. Assoc.

Industrial Furnaces

New Orders—Thousands of Dollars

	Fuel Fired*		Electric	
	1951	1950	1951	1950
Jan.	4,033	1,914	2,764	473
Feb.	4,670	616	3,212	697
Mar.	7,019	1,390	4,846	753
Apr.	8,497	837	3,657	415
May	5,644	1,392	4,766	982
June	6,259	1,166	3,370	1,328
July	5,527	2,247	5,363	1,445
Aug.	4,850	3,927	3,861	1,039
Sept.	...	1,817	...	1,485
Oct.	...	2,306	...	1,603
Nov.	...	2,068	...	2,157
Dec.	...	2,749	...	1,506

* Except for hot rolling steel.
Industrial Furnace Mfrs. Assn.

On any burnishing problem

DEPEND on DU-LITE for a Sparkling Finish

Courtesy Bevin Bros. Mfg. Co.

After tumbling with an ordinary compound, these kids' bicycle bells came out a dull lifeless gray. Substituting Du-Lite's #3 Burnishing Compound completely removed the gray soapy film, and gave the bells a bright mirror finish at a substantial saving of compound per month.

What's YOUR problem?

Du-Lite's service to industry is complete from research on specific metal finishing problems to installation of processing equipment. Du-Lite's line includes cleaners, strippers, blacking agents, wetting agents, passivating agents, rust preventatives, burnishing compounds etc. for any type of metal.

See your nearest Du-Lite Field Engineer or write for more information.

DU-LITE CHEMICAL CORP.
MIDDLETOWN, CONN.

Rush information on your products for finishing following metals:
Aluminum ..... Steel ..... Stainless Steel .....
Brass ..... Copper ..... Zinc .....
Others .....
Name .....
Company .....
Address .....
City ..... Zone ..... State .....
2

Du-Lite
METAL FINISHING SPECIALISTS

EVEN OUR COMPETITORS' BEST CUSTOMERS INSIST ON SUNOCO WAY LUBRICANT

In the competition for industry's lubrication business, all refiners are constantly improving their products. Every so often, one company or another finds a way to make a petroleum product that, for a particular use, licks to a standstill anything its competitors can offer. Immediately the others dig in and try to find the secret. Until they succeed, the originator's ingenuity pays off in a rising flood of sales.

That is the happy position in which Sun Oil Company finds itself with its Sunoco Way Lubricant. Since its introduction eight years ago, no other refiner has been able to match this tableway lubricant. Here is proof any man in metalworking can appreciate:

Sunoco Way Lubricant is insisted upon by 188 metalworking concerns which buy all their other lubricants from our competitors.

In other words, our competitors have loyal 100% customers, just as we have; but when it comes to tableway lubrication, loyalty goes out the window and Sunoco Way Lubricant is specified.

The reason for the success of Sunoco Way Lubricant is that no one has been able to equal it for *protection of tableways . . . ability to prevent "stick-slip" . . . prevention of table flotation . . . resistance to wiping off or squeezing out under heavy loads.* These benefits add up to higher production, better finishes, lower maintenance costs, longer tool and machine life. That is why Sunoco Way Lubricant is approved or definitely recommended by 38 of America's leading machine tool builders.

Want to see factual case histories and learn more about this product? Send for illustrated booklet, "Sunoco Way Lubricant." Samples are available, too, to companies in the metalworking industry. Write Dept. S-10.

SUN INDUSTRIAL PRODUCTS

SUN OIL COMPANY, PHILADELPHIA 3, PA. • SUN OIL COMPANY, LTD., TORONTO AND MONTREAL

SUNOCO®

Men of Industry

GUNNAR PALMGREN
. . . a vice president of SKF

JOHN F. ANSINK
Round Chain vice president

CHARLES P. HAMMOND
gen. supt. at Green River Steel

Gunnar Palmgren was elected a vice president of **SKF Industries Inc.,** Philadelphia. He will be in charge of engineering and research. Mr. Palmgren has been with the company for 32 years, and was assistant vice president and chief engineer prior to his promotion.

H. E. Chilcoat was appointed assistant general sales manager of **Townsend Co.,** New Brighton, Pa. He was manager of its railroad sales department and in addition to his new duties continues direction of sales to railroads. He was formerly vice president in charge of sales for Pressed Steel Car Co.

August E. Klinger was appointed a vice president of **H. K. Porter Co.,** Pittsburgh. He will act as general manager of the newly acquired Buffalo Steel Division, Tonawanda, N. Y.

Andrew TenEyck was appointed sales manager of **Soss Mfg. Co.,** Detroit. He fills a vacancy resulting from the recent election of **Samuel Soss** to the presidency.

United States Steel Supply Co., Chicago, appointed **Orville F. Figley** assistant to vice president-sales, **Keith P. Rindefleisch** as Chicago district manager to succeed Mr. Figley, and **Wesley N. Gordon** succeeds Mr. Rindefleisch as Pittsburgh district manager. **Walter Kilimnik** becomes manager of the alloy division succeeding Mr. Gordon.

Donald W. White was appointed advertising manager, **Commercial Controls Corp.,** Rochester, N. Y. He succeeds **Henry J. Lindsay,** resigned.

John F. Ansink was elected vice president of **Round Chain & Mfg. Co.,** Chicago. He has been general manager of the company since its formation two years ago and continues in that capacity. Previously he was Chicago district manager, Cleveland Chain & Mfg. Co., another of the Round Chain Companies.

Harvey J. Haughton was appointed assistant to Executive Vice President **C. L. Austin, Jones & Laughlin Steel Corp., Pittsburgh.** He formerly was accountant-statistician in the planning and control department.

Cleveland Diesel Engine Division of General Motors Corp. promoted **Tom E. Hughes** to assistant general manager, and **Roger D. Williams** as general sales manager succeeding Mr. Hughes.

DoAll Co., Des Plaines, Ill., appointed **Henry Sokol** general manager at Detroit, **John B. Reichle,** general manager at Toledo, and **Clayton C. Clegg,** general manager at Pittsburgh.

Sam Littlejohn was elected commercial vice president of **General Electric Co.** Formerly manager of the Atlantic district office of the company's apparatus organization in Philadelphia, he will be engaged in customer relations activities with headquarters in Cleveland.

Apex Railroad Products Co., Chicago, elected **Leo F. Duffy** as president and a director, effective Nov. 1. He will succeed **Edward T. Doherty,** elected chairman of the board. Mr. Duffy presently is vice president of Youngstown Steel Door Co.

Charles P. Hammond was appointed general superintendent of **Green River Steel Corp.,** Owensboro, Ky. He has been general superintendent of Rotary Electric Steel Co. since 1948.

Frank Richter was appointed to the purchasing department, scrap iron division, **Price Iron & Steel Co.,** Chicago. He will have charge of Michigan, Indiana, southern Illinois and Kentucky.

Edward L. Horton was named chief engineer, **Gross Machinery Co. Inc.,** Buffalo.

R. B. MacKenzie was made assistant sales manager, **Parker Appliance Co.,** Cleveland. His primary assignment will be co-ordination and handling of activities resulting from defense program requirements for Parker material in its fitting, valve, jet parts and rubber divisions.

Robert A. Campbell, formerly a vice president and general manager, Hinderliter Tool Co., division of H. K. Porter Co., has joined **Ball Bros. Co.,** Muncie, Ind., as a special assistant to **Robert W. Biggs,** vice president and manager of glass manufacturing.

Paul V. Shields resigned as chairman of **Curtiss-Wright Corp.,** New York. He is succeeded by **Roy T. Hurley,** president, who will hold the two positions. Mr. Shields remains as chairman until Dec. 31.

Ray G. Pinkerton is now associated with **Peerless Heater Division,** Eastern Foundry Co., Boyertown, Pa., as sales manager in charge of the sale of Peerless boilers for fuels and Peer-

less tank heaters for coal firing. He formerly was manager of unit sales, Eureka-Williams Corp.

R. E. Howard was appointed comptroller and assistant treasurer, **Davey**

R. E. HOWARD
. . . *Davey Compressor comptroller*

Compressor Co., Kent, O. For the last six years he has been manager of the company's internal orders and invoicing departments.

Ross Anderson, general manager of the Verona Works of **Ingalls Iron Works Co.** in the Pittsburgh district, was appointed sales manager, northern division, with headquarters in New York.

Robert M. Hoel was appointed sales agent for **American Car & Foundry Co.** at Chicago.

Jerry Reiling was appointed district manager in the Philadelphia-Baltimore territory for **Hyster Co.**, Portland, Oreg.

J. J. Rosecky was appointed general manager of the Torrance, Calif., plant of Ideco Division, **Dresser Equipment Co.** Before joining Ideco he was vice president — manufacturing for Heil Co.

Ford Motor Co., Dearborn, Mich., appointed **John W. Schneider** plant manager of its Dearborn specialty foundry. He has been acting plant manager since February, 1950.

Promotions in the engineering division of **Cleveland Graphite Bronze Co.**, Cleveland, include: **Edwin Crankshaw**, chief engineer for product and design; **Joseph Palsulich** and **Richard J. Schager** as assistant chief engineers specializing, respectively, in aircraft bearings and allied products, and in automotive and diesel products; **Joseph F. Cerness** as chief metallurgist; **W. N. Goldenbogen**, chief chemist; **Wilbert H. Morrison**, assistant to the director of research; and **Harry Pochapsky**, chief electrochemist.

William Rowley was appointed manage of **Aeroquip Corp.'s** new office located in the Monument building, Dayton, O. He has been a staff engineer since he joined the company in 1948.

Steel Improvement & Forge Co., Cleveland, appointed **Albert W. Smith Jr.** as controller. For the last seven years he was with Cooper-Bessemer Corp. as assistant controller.

Wenzel A. Lindfors was appointed sales manager, **New York Belting & Packing Co.**, Passaic, N. J.

Midway Tool Co. Inc. Melvin, O., elected **Leo F. Weston Jr.** as pres-

LEO F. WESTON JR.
. . . *president of Midway Tool*

ident. For several months Mr. Weston has served as company general manager in charge of the Midway plant in Melvin and its executive offices in Cincinnati. He continues to administer those duties.

J. B. Laramy was appointed manager, marketing research department, **Worthington Pump & Machinery Corp.**, Harrison, N. Y. He has been assistant manager at Chicago.

George T. Humphrey Jr., formerly assistant branch manager at Dallas in the service sales division of **Timken Roller Bearing Co.**, Canton, O., was appointed assistant general manager of the division.

Thomas E. Moffitt succeeds **John D. Rue**, retired, as works manager of the Tacoma, Wash., plant of **Hooker Electrochemical Co.** Other promotions there are **George Gentes**, plant engineer to succeed **H. D. Norris**, retired; **Edwin A. Adams**, purchasing agent; **Chester D. Roberts**, traffic manager to succeed **C. A. Stewart**, retired; and **Russell Hansen**, master mechanic to succeed **A. K. Hansen**, retired.

Rudolph J. Lesnik was appointed chief engineer of **Gorham Tool Co.**, Detroit.

Dearborn Chemical Co. Ltd. appointed **Dr. William A. James** as director of research at its Toronto laboratories, and **Jerry Shaw** as sales representative.

R. M. Casper heads the power department of **Allis-Chalmers Mfg. Co.**, Milwaukee, which now combines the electrical and mechanical power departments of the company. New power department appointments also include **F. W. Bush**, assistant manager-electrical sections; **C. C. Jordan**, assistant manager-mechanical sections; **R. N. Miers**, manager-steam turbine section; **C. R. Braun**, assistant to Mr. Casper; and **E. J. Schlebenes**, office manager.

Beryllium Development Inc., a mining subsidiary of Beryllium Corp., Reading, Pa., announces the retention of **Jack W. Clark**, formerly of the Bureau of Mines, as consultant in the development of beryl ore mining. He will also act as technical director for all mining operations in the U. S. and Canada. He is presently making a survey of the entire beryl ore picture.

L. F. A. Mitchell was appointed division product sales manager by **General Cable Corp.**, manufacturer of

L. F. A. MITCHELL
. . . *div. product sales mgr., General Cable*

electrical wires and cables. He will be located in New York.

Erling Wessel, vice president and general manager, Beal Tool Division,

Large or Small

Wean CAN SOLVE YOUR SLITTING PROBLEM

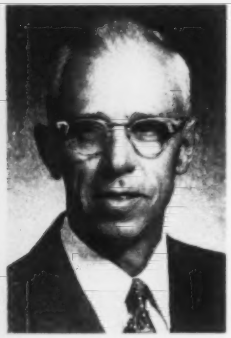
If you are in the business of handling strip steel or fabricating steel parts or products from strip steel you should give your slitting operation high consideration.

Well designed slitting lines enable you to reduce inventories, lower labor costs and eliminate expensive extras. Wean engineered slitting lines give you these important factors at lowest initial costs.

If you have a slitting problem—or merely desire a check on the efficiency of your present operation—call in Wean specialists.

Wean Equipment Corporation

CLEVELAND, OHIO



JOHN G. MOORHEAD
Chevrolet-Detroit Forge plant mgr.

HARRY E. HASELTINE
. . . marketing V. P. at Copco

MALVERN J. HILER
. . . president of Commonwealth Engineering

Hubbard & Co., Pittsburgh, was elected a director.

John G. Moorhead was appointed plant manager, **Chevrolet-Detroit Forge Division,** General Motors Corp. He joined General Motors Central Forge organization in 1918. After it was taken over by Chevrolet in 1922 he was advanced to trimmer die maker in 1923, foreman in 1926, and gradually assuming positions of increasing responsibility, he was appointed general superintendent of production in 1949.

Donald Petersen was elected vice president - production for **Standard Railway Equipment Mfg. Co.,** at Hammond, Ind., New Kensington, Pa., and Lachine, Que., plants.

Lockheed Aircraft Corp., Burbank, Calif., appointed **Fred Trygg** plant manager, and **Howard Hahne,** production foreman of its Bakersfield, Calif., subassembly plant.

H. Gilbert Stewart was appointed southern territory district manager for **Atlas Chain & Mfg. Co.,** Philadalphia.

Harry E. Haseltine was elected vice president in charge of merchandising and sales promotion for **Copco Steel & Engineering Co., Detroit.** He will have charge of marketing all Copco building products.

Joseph C. Henry Jr. was named assistant superintendent, and **Harry C. Paxson,** assistant to the superintendent in the refractories and fuel department of **Lukens Steel Co.,** Coatesville, Pa.

Dr. Victor S. Hicks was appointed chief physicist of **Tracerlab Inc.,** Boston.

John A. Hoholik was named superintendent of the axle plant at **Buick Motor Division,** Flint, Mich., General Motors Corp.

John M. Dumser was appointed assistant to the general sales manager of the **Wolverine Tube Division,** Calumet & Hecla Consolidated Copper Co., Detroit.

Byron S. Brokaw is manager of production planning and control at **Link Aviation Inc.,** Binghamton, N. Y.

Malvern J. Hiler was appointed president of **Commonwealth Engineering Co. of Ohio,** Dayton, O. He served for the last three years as executive vice president.

James W. Murray, who recently joined **Fabricators Steel & Mfg. Corp.,** New York, was promoted to general sales manager.

C. W. Moss was appointed director of market research and analysis for **Kaiser-Frazer Corp.,** Willow Run Mich. He succeeds **J. L. Friedman,** who assumes new duties as contract consultant in the K-F defense manufacturing program.

Daniel W. Kallman and **J. T. O'Rourke** were appointed sales engineers of the eastern division for **British-American Carbon Corp.'s** Delanium carbon cubic heat exchangers. They will work out of New York headquarters.

General Controls Co., Glendale, Calif. appointed **Robert C. Servat** manager of its new branch office in New Orleans. **Eldon Burnett** was made manager of the newly opened Omaha, Nebr., branch.

OBITUARIES...

Henry H. Erkelenz, 72, a former vice president and member of the executive committee of **Harnischfeger Corp.,** Milwaukee, died Oct. 6. He retired two years ago.

Calvin Sterling, 49, since 1935 head of the analytical section, Bayonne, N. J., research laboratory, **International Nickel Co. Inc.,** died Oct. 1. He joined the company in 1925.

James H. Morris, 72, who retired five years ago as secretary and assistant treasurer of **Inland Steel Co.,** Chicago, died Oct. 1 in Sherman Oaks, Calif., where he had made his home since retirement.

William A. Bell, 82, president and chairman of the board of **Yakima Hardware Co.,** Yakima, Wash., died Sept. 26. One of the founders of the company in 1897, he first was secretary-treasurer and general manager.

C. W. Fedders, 75, former vice president, **Fedders Mfg. Co. Inc.,** Buffalo, died Sept. 30. He was co-inventor of the first water-cooled auto radiator.

Peter L. Robertson, 71, president of **P. L. Robertson Screw Mfg. Co.,** Oakville, Ont., died Sept. 29. He was inventor of the socket head principle of driving screws and founded the company 43 years ago.

Halliday Richardson, superintendent of the scrap works of **Crucible Steel Co. of America** in Syracuse, N. Y., died Sept. 29.

Clarence Dunn, 52, personnel director of **Pressed Steel Tank Co.,** Milwaukee, died Oct. 3.

Harold L. Heywood, 55, development engineer at **Kearney & Trecker Corp.,** Milwaukee, died Sept. 20.

Wiggins Gasholder does 7 years' work in 11 months!

Pilot gasholder stores coke oven gas for nationally known steel maker. *Dry seal proves thoroughly effective!*

March 13, 1950, a pilot plant test was begun to determine suitability of the Wiggins neoprene dry seal in storing debenzolized coke oven gas. Automatic controls were installed which filled and emptied the gasholder every hour. This was the operation over the first several months. During the remaining period, this cycle was alternately speeded up and slowed down. On February 13, 1951, this Wiggins Gasholder test was completed—after 11 months and 2,650 cycles—roughly equivalent to 7 full years of operation at one cycle per day!

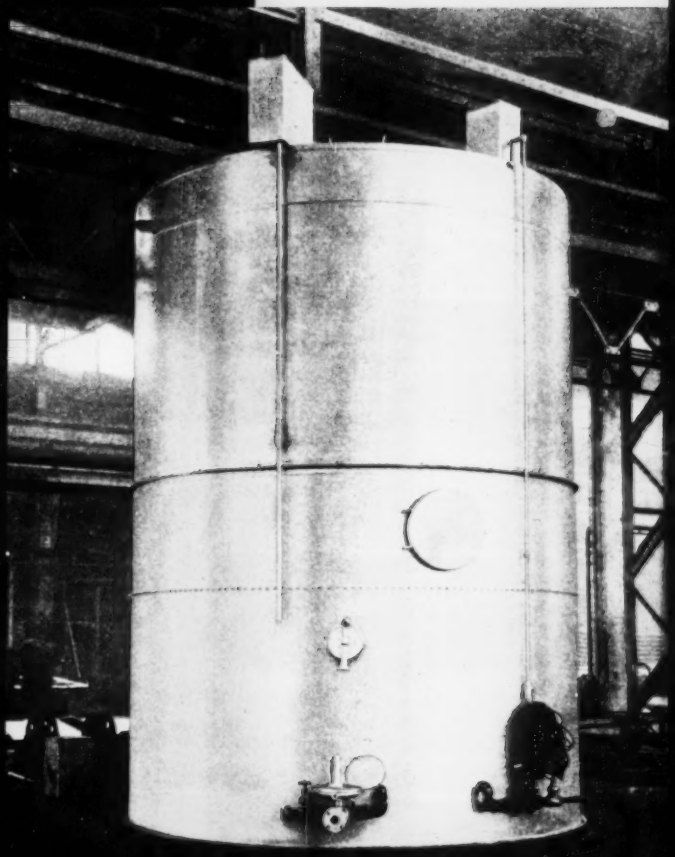
During the entire test period coke oven gas was in continuous *direct contact* with the seal fabric. Temperatures in the gas space ranged from over 100° F. to below 0° F. During much of the test, inside surface of seal was wet with condensate. All these combined to give as severe a test as anything that could be expected.

THESE WERE THE RESULTS:

Air side of *dry seal* in original condition.

Neoprene coating on gas side flexible and resilient—unaffected by chemical action. No hardening or cracking.

All seams gas-tight. NO HARMFUL EFFECTS TO DRY SEAL.



Test Wiggins Gasholder—11′ 5″ diameter; 16′ 0″ high. Maximum movement of piston—10′ 10 11/16″.

Wiggins is the ONLY gasholder using an *absolutely dry, frictionless seal.* No water, tar or grease. No weather worries, operating costs or maintenance problems. No replacement of sealant. Write for new BULLETIN WG-22 . . . or refer to Builders' Committee Report (May, 1951) American Gas Association.

WIGGINS VAPOR SEALS
GENERAL AMERICAN
TRADE MARK

GENERAL AMERICAN TRANSPORTATION CORPORATION

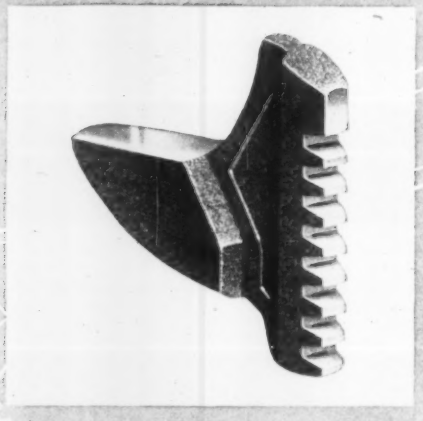
135 South LaSalle Street, Chicago 90, Illinois

Branch Offices: Buffalo • Cleveland • Dallas • Houston Los Angeles • New Orleans • New York • Pittsburgh San Francisco • Seattle • St. Louis • Tulsa • Washington

Export Dept.: 10 East 49th Street, New York 17, New York

Plants: Birmingham, Ala.; East Chicago, Ind.; Sharon, Pa.

Lower Cost-per-piece:



BROACHING *saves* $2112.00 *Monthly*

. . . *cuts manpower needs* 75%

DETROIT BROACH CAN CUT YOUR COST-PER-PIECE

by

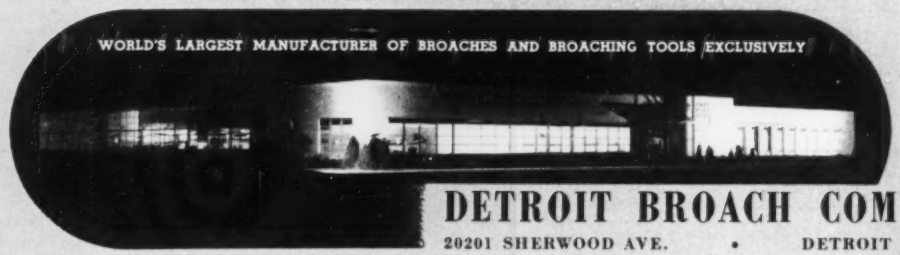
1 Developing broaching set-ups to replace other, more costly machining methods.

2 Re-design present broaches and broaching set-ups to make them more efficient.

Two milling machines and two operators per shift, two shifts a day, were required to produce the rack teeth and finish the jaw face on 8000 movable wrench jaw forgings. The Detroit Broach set-up which has replaced the milling operations produces the same number of parts with one operator, one machine, on one shift per day . . . savings in labor alone amount to $2112.00 monthly! And that's not all.

The original tool cost for the broaching set-up was lower and the cost of tool maintenance is reduced materially. In respect to quality, the manufacturer reports much better surface finish, more consistent dimensions, uniformity of parts.

If you are boring, slotting, reaming or milling *your* parts, chances are that Detroit Broach can reduce your cost-per-piece. Why not investigate today? Detroit Broach engineers will gladly discuss your operations and give you actual cost and production data on broaching them.



DETROIT BROACH COMPANY

20201 SHERWOOD AVE. • DETROIT 34, MICH.

Production AND Engineering NEWS AT A GLANCE

HOW ABOUT FASTER HOBBING?—Blanks for dies to be produced by hobbing must be relieved, usually by removing metal from the bottom to the extent of about 60 per cent of the steel to be displaced by the hob. Conventional practice is to hob slowly; however, recent experiments have shown that faster hobbing gives deeper cavities up to a certain point. For example, in one series of tests, pressures were increased from 90 to 125 tons in a period of 45 seconds as compared with 90 seconds. Cavities hobbed at the faster speed were from 0.050 to 0.090-in. deeper. It is felt that more investigation in this direction might lead to interesting results.

ORDNANCE GOING TO SHROUDS—Vinyl chloride plastic shrouds 0.008-in. thick developed by Army Ordnance will replace canvas tarps, wood boxes and crates, in protecting shipments of ordnance materiel and for outdoor storage. Shrouds will be made in 50 different sizes, can withstand 60 mph winds and temperature range from subzero to more than 95 °F. A plastic covering for a 20,000-pound machine weighs only 30 pounds.

KEEP CHECK ON ABRASIVE—Operators are finding they can capitalize on the normal breakdown of abrasive in barrel tumbling by rescreening the barrel charge periodically and using the smaller sizes screened off for correspondingly smaller parts for which they are best suited. The bulk of new abrasive purchases thus falls in the coarsest sizes required. The ideal setup is to be equipped to resize the abrasive after each run so as to keep it graded at all times and thereby eliminate contamination of any given size with undersize particles.

VANDAL-PROOF SCREWS—Fiendish little "doodlers" who go around surreptitiously removing slotted head wood or machine screws with files, knives, coins or just plain finger-nails will be completely frustrated by a new type of screw head which has nothing more than two small holes drilled in a dial press to take a spanner-wrench bit. Center line of the holes is the same as the shank diameter of the screw under the head. Copper screws in electrical installations can be further masked by dropping solder into the spanner holes and wiping it off smoothly.

CERAMIC ON MILD STEEL—Suspension of insoluble refractories in a borosilicate matrix is being fired on mild steel surfaces at around 1450° F to provide a heat-resisting material suitable for temperatures in excess of 1200° F, by a British refractories supplier. The method was developed during the war for protecting mild steel exhaust pipes on aircraft engines. Currently it is being applied successfully to baffle plates and panels of radiant heaters. Treatment may be a single coat 0.004-in. thick or a double coat 0.020-0.060-in., the outer layer being porous. Known as Stoneclad, the process is not recommended where high temperature is accompanied by considerable stress.

HANDS ACROSS THE PRESS—A manufacturer of motor lamination "doughnuts" has multipled his production rate by six through installation of an automatic press setup, including coil feed and an "iron hand" unloader. The unloader has been operated successfully at speeds in excess of 42 strokes per minute, about 30 per cent beyond its rated maximum.

PERFUME IN REVERSE—Rated as the worst smell in captivity is the stuff called isopropylmercaptan which costs a neat $210 an ounce to produce. It has no direct use as yet, but petroleum plants put it to work as a sort of tracer. Mixed in certain chemicals, the bad odor can be compared with its pure form to determine concentration in the sample. Presumably they must employ isopropylmercaptan sniffers for this work.

MILL SPEEDS DAZZLE—Appetites of modern steel rolling mills seem almost limitless under the deft touches of motor and drive engineers who have devised installations spewing out rolled material at speeds of 40 per cent better than only a few years ago. All the way from the powerful new blooming mills slated for early operation to precision cold reduction stands the emphasis is on speed. Electrical and mechanical specialists have come to bat in grand fashion to turn the trick. —p. 88

HOW AND WHY OF BORON—Metallurgists still do not profess to know all the whys and wherefores of the boron effect on hardenability of constructional steels. At the same time they do recognize its very definite values in terms of alloy conservation. According to one popular hypothesis boron acts as a fluxing agent upon the particle size of nitrides of other elements such as silicon, aluminum, titanium and zirconium, converting harmful critical particles to larger sizes incapable of effecting nucleation. For a good primer on boron engineering steels, turn the page.

—A.H.A.

Metalworking Outlook—p. 39 Market Outlook—p. 141

BORON ENGINEERING

As experience is gained using boron in a wide variety of base compositions our knowledge of the mechanism by which boron achieves its effect will be enhanced and its range of usefulness consequently broadened. The development of boron steels must be pushed forward rapidly to conserve our dwindling supply of the more versatile alloys such as nickel, chromium and molybdenum for the complex technical jobs they have to do and which boron will not do.

If our "alloy civilization" is to develop and expand, the limited known reserves of the conventional alloying elements must be saved for more important uses than conferring hardenability on engineering steels. Boron, which occurs in the U. S. in over-abundant supply, appears now to be the element to do the job. We must unveil its mystery and make knowledge of it commonplace.

By CHARLES M. PARKER
Metallurgical Engineer
American Iron & Steel Institute
New York

AT THE START of World War II we were faced with a shortage of alloying elements which forced the development of the lean nickel-chromium-molybdenum engineering steels known then as National Emergency steels. For some time after their announcement their use was made mandatory by the War Production Board. Many consumers used them reluctantly and their attitude toward the steels was not improved by the terms "emergency" and "substitute", which were so freely used to describe them.

In addition, conventional mechanical property data on which some engineers relied were not immediately available and the implications of the standard end quench hardenability test were little understood or appreciated outside the steel and automotive industries. There was also some unwillingness to accept and use data obtained from experimental electric furnace heats and even from single heats of commercial size.

Steels Now Accepted—As time wore on and as production and use of the new steels mounted into the millions of tons, animosity toward the new steels diminished and men who had previously sought to find faults started to look for virtues. That they found them is amply demonstrated by the fact that after the war most of the "emergency" steels became standards and their peacetime production has been in the neighborhood of 15 per cent of total engineering alloy steel.

While that developmental work was going on a search was under way for new alloying elements and new methods of obtaining an "alloy effect" in both plain carbon steels and leanly alloyed steels. Some experiments with complex deoxidizing agents containing vanadium, titanium and aluminum showed considerable promise in improving the hardenability of carbon and engineering alloy steels. Moreover, heat treated in the same section size to the same hardness the steels deoxidized with the complex alloy showed marked increases over conventional steels of the same base composition in tensile strength, yield point, elongation, reduction of area, and impact strength.

At about the same time other experiments were conducted using ferroboron, and the same results were obtained as with the complex deoxidizers, which at the time were not known to have contained boron.

Commercial Use Limited—For several years little use was made of either the complex deoxidizers or ferroboron, except for the improvement of tank armor, tank torsion bars, and armor-piercing shot. Commercial use of alloy treated or boron steels was largely limited to the 1300 series by Buick, a low chromium boron steel for diesel engine crankshafts by Park Drop Forge Co., a 0.50 per cent carbon boron steel for hand tools by Plomb Tool Co., and steels of the 9400 and 8600 series plus boron by Caterpillar Tractor Co. More recently Mack Mfg. Co. and Pratt & Whitney Aircraft have used boron steels for critical heavy-duty applications.

How Much Boron?—Quantity of boron which is effective in improving the hardenability of steel is almost infinitesimal. For that reason it was considered smart during the development days to characterize boron steels by such colorful names as "vitamin treated," "needled," "alloy treated," or "hopped-up." Such terms did little to advance the cause of boron steels. In fact, they slowed down many development efforts because fundamentals were lost sight of. Then too, the fact that for several years adequate methods did not exist for determining the quantity of boron present in steel made many consumers suspicious of the quality of the steel and skeptical as to reproducibility of results.

Even today when there are available adequate and accurate chemical, spectrographic and metallographic methods of determining boron in steel the easiest and most efficient method of determining its presence and effectiveness is the standard end-quench hardenability test.

Alloying Element—An examination of the literature of the past 60 years will leave little doubt that boron is truly an alloying element which deserves its proper place in the field of ferrous metallurgy. Boron is not a versatile alloying element, however, exerting its effects on the mechanical properties of steel only through its potency in increasing hardenability. There are fragmentary references in the literature which tend to indicate that boron may have substantial effects on the corrosion resistance and electrical characteristics of steel, but the statements are not sup-

ported by adequate experimentation and data.

The effect of boron on hardenability expressed as a factor of the Grossmann type can be calculated from the equation developed by Rahrer and Armstrong as a result of their studies on the effect of carbon content on the hardenability of boron steels. They found that with boron additions of 0.0006 to 0.0045 per cent only carbon content and intensity of deoxidation affect the hardenability factor for boron to a marked degree.

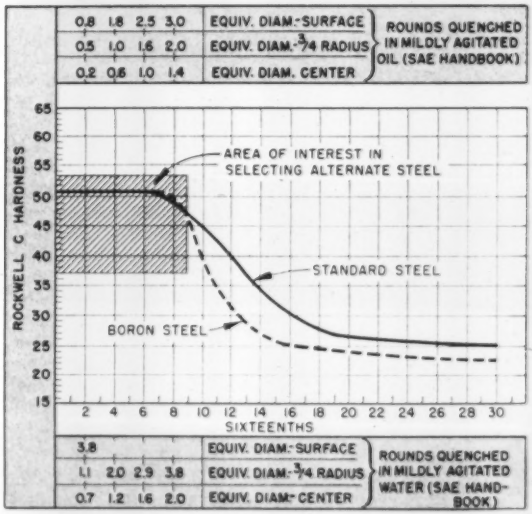
Using the formula Fb = 1 + 1.5 (0.90 − C), in which Fb represents the boron factor and C the carbon content of the steel in per cent, one may calculate the hardenability conferred by boron over and above that conferred by the carbon content of the steel by multiplying the carbon factor by the boron factor. The equation is applicable to fine-grained fully-deoxidized steels containing a minimum of 0.0008 per cent boron.

Hardenability Increases — The expression in the equation concerning carbon, limits the beneficial effect of boron to steels containing 0.90 per cent carbon or less and that the beneficial effect of boron on hardenability increases as the carbon content of the steel decreases. That fact has been confirmed by many investigators both in the United States and abroad.

For carburized parts the proper contents of carbon and alloys other than boron must be chosen to obtain desired properties in both case and core. Since boron has little or no effect above about 0.80 per cent carbon only the carbon content can be depended upon to secure the desired hardness in the case. In the quantities used in engineering steels boron does not add to mineralogical hardness as it adds to ability to harden in depth. On the other hand, the hardenability effect of boron may make necessary an adjustment of the other elements of the steel to provide proper hardness limits at proper levels.

Must Be Quenched and Tempered—Effect of boron is realized only in steels which have been quenched and tempered. Therefore, if boron steels are to be used for parts which are only partially heat treated, such as integral shaft and gear designs in which only the gear is heat treated, one must check carefully the untreated portion to avoid failure in torsion because of insufficient hardness and accompanying strength.

Until they are quenched and tempered, steels containing boron act like steels of the base composition without boron. That is not an unfamiliar fact because the maximum effects of the conventional alloying elements do not make themselves apparent until the steels containing them have been quenched to substantially complete martensite and subsequently tempered. But in heating for quenching or in quenching directly from the carburizing temperature boron steels exhibit a phenomenon which is not fully understood. Grange and Garvey reported in 1946 that if boron steels were heated to high temperatures prior to quenching this sometimes resulted in a partial or even complete loss of hardenability. Hardenability can be restored by slow cooling to 1550° F prior to quenching or by slow cooling to room temperature followed by reheating to 1550° F and quenching. Those procedures are also beneficial in minimizing distortion and quench cracking.



Method of comparing boron and standard steels

Fading Effect — Some early investigators have reported a similar fading of the boron effect in steels which have been heated for a comparatively long time prior to forging. More recent results have shown that a fading effect does not occur unless the time of heating is extended to equal or exceed the time required for carburizing.

Early investigators have also reported a reduction in hardenability of boron steels as between the first, middle and last ingots of a heat. It is now clear that such reduction has been eliminated by proper steelmaking practices, particularly in respect to deoxidation practices prior to making the boron addition.

Curve Varies — Shape of the hardenability curve for boron steels varies somewhat from the shape of the curve for more highly alloyed steels in that it drops more abruptly from its plateau of maximum hardness. As a general rule, the boron steels match or exceed the hardness values of standard steels for the first 6- or 8-sixteenths on the end quench curve, then drop more abruptly to lower values. This characteristic makes it imperative that those who contemplate using boron steels study carefully the relationship of the hardnesses of the part to be manufactured and the hardenability curve of both the standard steel in use and the proposed boron steel.

As long as the curves match to the equivalent sec-

tion size distance on the end quench curve, there is no cause for concern regarding replacement on the basis of equivalent hardenability. It is clear, however, that the critical section size cannot be exceeded when using boron steels as it could sometimes be when using the more highly alloyed standard steels.

Boron in the quantity used in engineering steels does not add to mineralogical hardness of steel. Therefore, concepts held for standard steels regarding the relationship of hardness to mechanical property values still hold. In the United States most metallurgists believe that for fully quenched and tempered steels a direct relationship exists between hardness and tensile properties, between the limits of 200 and 400 brinell. Such a relationship was adequately demonstrated during the last ten years by our experiences in the development of the lean triple alloy steels and their replacement of more highly alloyed steels.

End Quench Tests—It seems desirable at this point to recapitulate the metallurgical facts portrayed by the standard end quench hardenability test and relate them to boron steels. From that test one can determine: (1) Maximum hardness—a function of the carbon content, (2) depth of hardness—a function of the alloy content, (3) mass effect—a function of the cooling rate, (4) probable microstructure of the steel, and (5) ordinary mechanical properties.

From the foregoing we learn that the surface hardness of boron steels will be the same as for standard steels of the same carbon content when fully quenched. However, since the effect of boron increases with decreasing carbon content it is desirable to keep case carbon as low as possible, consistent with the requirements of the job to be done. In the uncased hardenability curves the boron steels maintain a hardness equal to or slightly less than surface hardness to a greater depth then drops more abruptly than the curves for standard steels.

That abrupt drop means that although boron is potent in increasing the depth to which steel will harden it is not as potent in large section sizes as relatively large percentages of elements, individual or combined, such as manganese, nickel, chromium and molybdenum. Boron cannot replace those elements in others of their more important effects as will be shown later.

Function of Cooling Rate—Depth to which a steel will harden is a function of the cooling rate which is itself influenced by the quantity and kind of alloying element present. Within the limits of its ability boron acts very much like conventional alloying elements with one exception. Like most alloying elements it delays the start of the austenite to martensite transformation, but unlike most alloying elements it does not change substantially the time of completion of the transformation nor the temperature at which the transformation is completed.

That explains why boron increases hardenability but does not produce fine pearlite and high strength in normalized steels as the other alloying elements do. It also means that annealing cycles for boron steels are shorter than those for standard steels because conventional alloying elements shift both start and finish of transformation toward longer times and lower temperatures.

Hardness Gradient Defined—The "mass effect" in steels which are heat treated defines the hardness gradient from surface to center in a given steel in a given quenching medium. Normally hardness of a quenched bar decreases from surface to center and hardness at the surface decreases as diameter of the section is increased. Those effects are related to the critical cooling rate of the steel, the rate at which a steel must be cooled in quenching to permit the complete transformation of austenite to martensite. That rate is depicted on the isothermal transformation diagram at the "nose" of the curve, and it is obvious that when the critical rate is exceeded a more successful quench is secured.

Nose Moved Right—The fact that boron moves the nose of the curve to the right as do all the conventional alloying elements except cobalt, is an aid to exceeding the critical quenching rate when proper media and methods are used. Microstructure of boron steels in both the as-rolled and heat treated conditions do not differ from the microstructures of other carbon or alloy steels. Most boron steels do, however, exhibit a "special constitutent" when heated to 2100° F. cooled rapidly to below A_1, and held until a structure characterized by a series of dots at the austenite grain boundaries is formed. That structure was first discovered by Guillet in 1907, confirmed by Portevin in 1909, and further developed by Grange and Garvey in 1945.

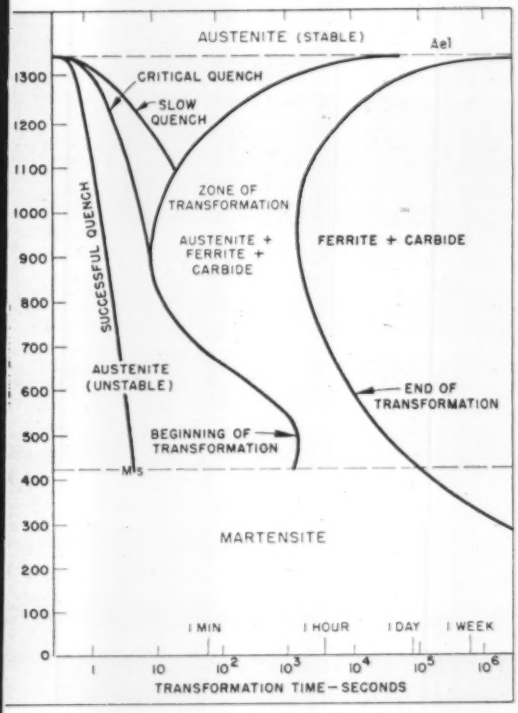
Lower Tempering Temperatures—Mechanical properties of properly heat treated boron steels have been found to be comparable to like properties of conventional alloy steels when the steels have been heat treated to the same hardness values. Boron does not, however, retard softening at elevated temperatures. Therefore, boron steels must be tempered at temperatures lower than those employed for conventional alloy steels in order to secure desired hardness or strength.

Effect of boron on temper brittleness has not been exactly evaluated, but it is clear that where temper brittleness is an important factor boron cannot substitute for molybdenum in relieving this condition.

Users have found, too, that boron cannot be substituted for molybdenum, vanadium, or tungsten in steels which must resist creep under stress at elevated temperatures.

Other Desirable Characteristics—Since 1938 some 190,000 tons of boron steels have been used successfully in engineering applications. In addition to reporting their adequacy from the standpoint of hardenability and ordinary mechanical properties people who have used those steels have reported the desirability of other characteristics. In the steel mills it has been found that boron steels can be rolled and forged in the same manner as steels of like composition without boron provided the boron content is below the level at which hot shortness occurs. The type of scale which forms on boron steels is rather light and flaky, is easily removed and has little tendency to adhere to the steel and be driven into the surface in forging or other hot forming operations.

Because of their lower total alloy content boron steels are thought to be less sensitive to shatter cracks than the more highly alloyed steels. This fact



Idealized IT diagram showing quenching curves and relation to "nose" of IT curve

simplifies heating and controlled cooling practices. People who have used these steels have found that their machinability is comparable to the base analysis without boron.

Higher Production Possible—Formability characteristics of boron steels in both hot and cold working are similar to the characteristics exhibited by the base analysis without boron. Generally speaking, this has made possible improved fabricating practices and higher production in terms of units per hour.

When heat treated to the same hardness values and the same condition of finish as conventional alloy steels, boron steels have exhibited like or better endurance limits and abrasion characteristics.

How Does Boron Do It?—It is evident from the foregoing that boron, in spite of the very small quantities employed, acts to a high degree just as do the conventional alloying elements. That, of course, brings up the question, "Why does boron do what it does?"

Two schools of thought seek to explain the mechanism of the boron effect. The first school believes that the effect of boron is caused by reason of its solution in austenite while the second believes that boron is effective because it changes the condition of steels with respect to some other element or elements present in all commercial steels and that the effect is closely related to deoxidation.

In the solution hypothesis the boron atom is held to be located interstitially in the gamma iron lattice thereby retarding the formation of nuclei or their rate of growth to the critical size necessary to the start of transformation, or both. It would appear, therefore, that the boron atoms are located in preferred positions prior to transformation and not at random as are the atoms of conventional alloying elements. For that reason, precipitation occurs rapidly and in advance of transformation of austenite to ferrite because only the boron atoms in solid solution are effective in decreasing the rate of nucleation of ferrite and increasing the rate of austenite transformation.

This hypothesis holds that only boron in solution at time of quenching can contribute to increase in hardenability and that undissolved boron is either without effect or may possibly act to decrease hardenability by assisting to transform austenite in the pearlite temperature range.

Fluxing Action — In the deoxidation hypothesis, it is believed that boron acts as a fluxing agent upon the particle size of nitrides of other elements such as silicon, aluminum, titanium and zirconium, converting harmful critical particles to larger sizes incapable of effecting nucleation. Hardenability of boron steels varies with the state of deoxidation of the steel and the final nitrogen content and that high soluble nitrogen, and possibly oxygen, is harmful to hardenability. When nitrogen is fixed by such elements as titanium or zirconium the hardenability effect of boron is preserved.

BIBLIOGRAPHY

1. Rahrer, G. D. and Armstrong, C. D. "Effect of Carbon Content on Hardenability of Boron Steels." *Transactions*, American Society for Metals. Vol. 40, 1948, pp. 1099-1123.
2. Grange, R. A. and Garvey, T. M. "Factors Affecting the Hardenability of Boron-Treated Steels." *Transactions*, American Society for Metals. Vol. 37, 1946, pp. 136-191.

More Power for Turbine Starts

A new line of turbine engine starters which substantially reduce the time required for starting turbine power plants is announced today by Hamilton Standard Division, United Aircraft Corp., East Hartford, Conn. Erle Martin, general manager, says the first starter developed by the company has passed its preproduction tests and has gone into limited production. The new products are lighter than the electrical equipment currently in use and deliver more horsepower.

In production for the Air Force's big jet bombers, the starter is operated by compressed air from a ground source or a turbine engine. The air is passed through a turbine wheel which is connected through a gear train to a clutch. When operating at full power, the turbine, which turns up to approximately 45,000 revolutions per minute, delivers over 100 horsepower for driving the engine's own turbine. The start is accomplished in about 20 seconds. Once a single engine of the bomber has been started, it provides a source of compressed air to be fed through the starter of the next engine.

Hamilton Standard's product is in line with the general trend toward pneumatic operation of accessory systems of turbine powered aircraft, Mr. Martin observes.

Big Space Savings Realized in Brazed Aluminum

BRAZED aluminum heat exchangers being built by Trane Co., La Crosse, Wis., effect big savings in space, weight and cost while performing at peak efficiency. Some of the units pack up to 450 square feet of heat transfer surface into a cubic foot of space, nine times the surface in a conventional shell-and-tube exchanger with $^3/_4$-inch tubes.

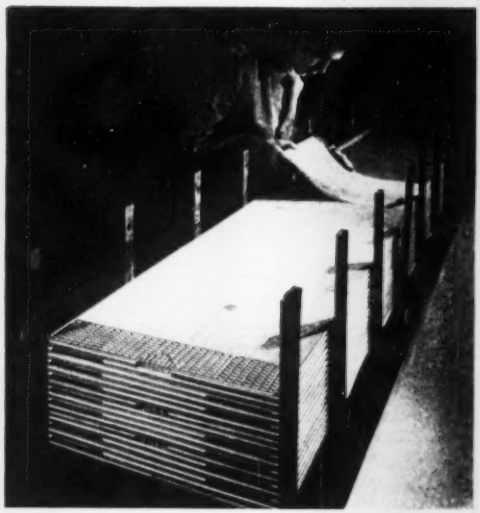
First large aluminum heat transfer units were built, tested and shipped less than a year ago and have been operating successfully since February in a tonnage oxygen plant designed and built by Air Products Inc., Allentown, Pa. These units continually withstand application and removal of pressures up to 1000 psi while the aluminum walls exchange heat between gases at temperatures ranging from 80 F to minus 300 F. Units built for chemical processes passed tests at pressures up to 1000 psi and temperatures from 500 F to minus 300 F.

Started on Aircraft—Giant industrial jobs grew from the intercoolers fabricated by Trane during World War II to cool hot, high pressure air from engine superchargers to temperatures suitable for efficient combustion in military aircraft. Air Force versions trimmed important poundage from equipment formerly used and contributed materially to higher ceilings, greater range and heavier armament. Expanded production of jets results in stepped up production of the small brazed aluminum heat exchanger.

Development work on the big units continued steadily since the end of the war. Basic design is quite simple. Units are built up of alternate layers of corrugated fins and flat aluminum sheets. Heat can be transferred from gas to gas, liquid to liquid or liquid to gas. Nor are these units limited to two streams like conventional heat exchangers but can carry as many as five different streams of gas or liquid. Streams can flow across each other, parallel to each other or in opposite directions. Another feature not readily available with existing equipment is that streams may be taken off at any point along the length of the new exchanger. Fundamental flexibility

Left—First step in fabricating brazed aluminum heat exchangers is crimping special aluminum strip into a simple, corrugated, serrated, perforated or herringbone pattern. Fin pressman is cutting a section of triple-serrated fin surface to length after it is formed on a specially designed fin press

Below—Heat exchanger core takes shape as corrugated fins are assembled between flat aluminum plates in the steel jig that will hold core during brazing process. Note each layer has a separate opening through which it receives or discharges stream of liquid or gas



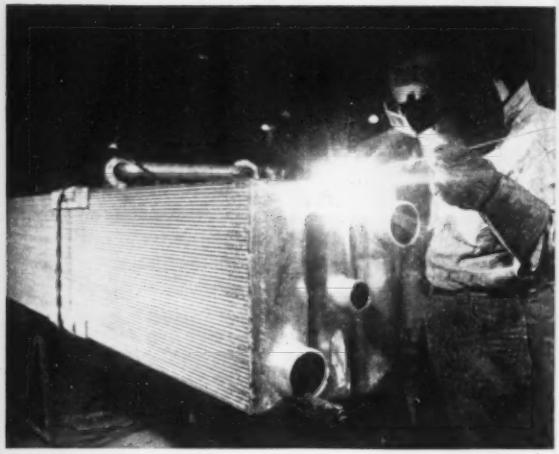
Heat Exchangers

of the core construction permits engineers to work out almost any conceivable combination of circuits, temperature drop and pressure drop for particular processes.

Critical Spot—Brazing the corrugated fins and flat plates together at temperatures close to the 1200 F melting point of the metal is the tough part in production. A special brazing aluminum sheet consisting of a core of pure aluminum with a coating of brazing material on either one side or both sides is used. The brazing material is about 92.5 per cent aluminum and 7.5 per cent silicon which reduces the

Right—Core is cleaned by steam and acid baths after brazing to remove all traces of flux. A chemical test follows to assure absolute cleanliness

Below—Preheated assembled core is plunged into flux bath at temperature of about 1100 F. Here core is being inspected after it has emerged from bath



Heat exchanger nears completion in this welding operation. It has upward of 7000 square feet of heat transfer surface in a compact area. Some units pack up to 450 square feet of heat transfer surface into a cubic foot

melting point of the coating material by about 100°F. While the melting points are about 100° apart it is necessary in actual practice to hold the brazing temperature within a range of 10 to 20°. The assembled cores are preheated and plunged into a molten salt bath at about 1100°F. Heat of the bath melts the coating of brazing alloy and produces a strong bond.

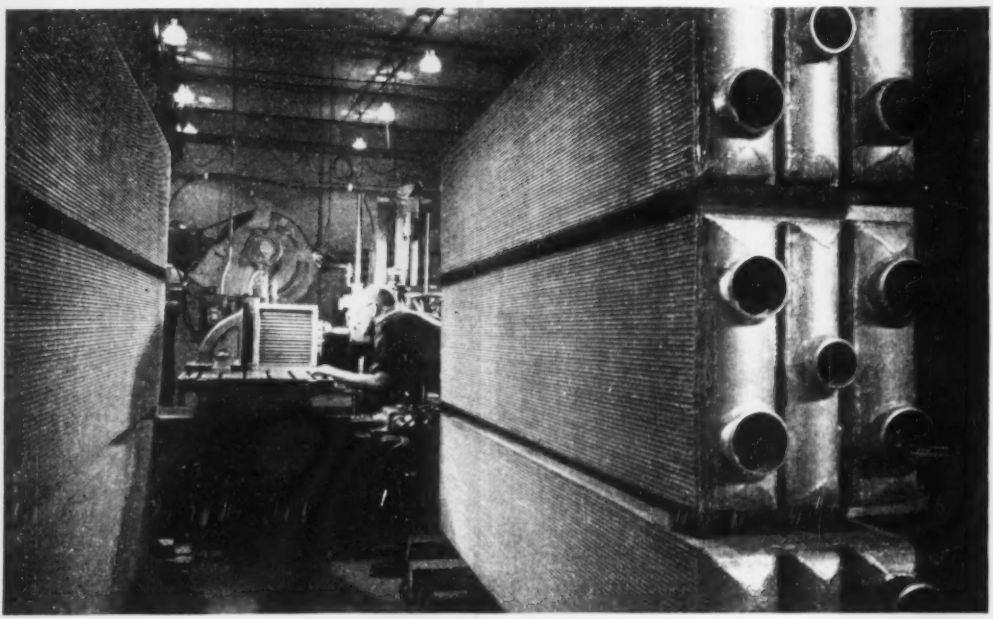
When core is cooled, it is carefully washed and cleaned to remove all excess flux. Each core is given a chemical test to insure removal of all traces of flux.

Careful control of raw materials, cleanliness, temperatures and duration of the various preheating, brazing and cooling phases of the operation is essential to produce units that will withstand the extreme temperature differences and operating pressures without failure. This production know-how was acquired through several years of intensive production experimentation.

Limiting Factor—Because tooling for individual designs is expensive, Trane's present production is limited to large heat exchanger batteries, running to several hundred thousand dollars, or to production runs of smaller units. The heat exchangers already completed or under construction for oxygen plants, chemical plants and military aviation are typical.

With an eye on the copper shortage, units can be developed for other volume markets. It is economically feasible, the company says, to use the new heat exchanger in the manufacture of radiators for automobiles, trucks, tanks or diesel engines. Production of such radiators might be warranted during a really critical copper shortage or when demand is high for lightest possible weights. Air conditioning is another field where these exchangers may some day be a weighty factor, company engineers speculate.

Below—Offering a study in contrast are the giant oxygen plant heat exchangers in the foreground and the lightweight aircraft intercooler being milled in the background



By GUY HUBBARD
Machine Tool Editor

Seen and Heard in

The Machinery Field

MACHINE TOOL AMBASSADORS: A few days ago I attended the 27th annual meeting of American Machine Tool Distributors' Association at Atlantic City. This meeting came at a critical time. After several years of neglect, including many months of downright poor business, the machine tool builders again find themselves tremendously overloaded with orders.

Most of these orders are for machines urgently needed on vital defense work. Many of them cover equipment which both dealers and builders long since foresaw would be needed but on which they could not get action when times were less hectic. The machine tool industry now is the target for barbed shafts of unjust criticism hurled by government agencies and by "private enterprisers" whose hindsight turned out to be better than their foresight.

And so it is that what looks to the man-in-the-street like a veritable economic feast, is anything but a savory banquet either to the builders or distributors. Impossible things are being demanded of the builders. They are doing a remarkable job under the circumstances. If the government and private enterprise only will exercise common sense and sane forebearance in this crisis, things will work themselves out satisfactorily for all concerned.

At this juncture, it devolves upon machine tool distributors to act as ambassadors between builders and users—including the government. They are highly qualified to handle this job. They are handling it with tact and discretion. It is a thankless job. It certainly isn't a profitable one.

Machine tool distributors earn their money through commissions on machines delivered and paid for. Today they are having to spend a lot of time and money too, explaining to customers why deliveries are delayed and why expected equipment has been diverted to other users in other territories. They are being called upon to give expert engineering service on machines which have been transferred into their territories from main plants elsewhere or from armed services' reserves. In other words, they are having to act as all-around diplomats, go-betweens, referees, service and repairmen and tool engineers—all this to a great extent "for free."

The distributors are doing a splendid job. It is a job that deserves to be better publicized. It is one of the major contributions to national defense.

"TENDERIZING" OF METALS: As a machine tool man, a primary search that I am making during my rounds of the Metal Show at Detroit this week, is for the latest ways and means of heat treatment to improve machineability. I long have been aware that this is one of the most important links between metallurgy and machining.

My first experience with this technique came about nearly 40 years ago. It was in connection with a typical beginner's job—turning, boring and facing cast iron bushings. As delivered to my lathe, the castings proved to be not only rough, but extremely hard. Probably they had been dumped out of the sand before having a chance to heat treat themselves. Carbon steel, high speed steel and stellite tools literally melted away against their hard shells.

Finally a helpful old-timer noticed my troubles. He sent me down to the blacksmith shop with a load of the blanks. An equally helpful blacksmith heated them red hot in a furnace—giving them a thorough heat soaking therein—then buried them in a pile of ashes. He told me to come and get them in about 24 hours. That I did, and while they still did not cut like proverbial chunks of butter, there certainly was 100 per cent improvement in machineability.

That is just a simple, homespun example of what can be done by the heat treating fraternity in the way of helping the metalcutting fraternity. Since that distant day, I have seen similar "tenderizing" done much more scientifically, with much more laboratory equipment, on much larger parts. These have included main frame and head castings for precision machine tools. Not only does it make them machine easier, but also it relieves them of internal strains so that the castings stay put after machining.

In view of unquestionably valuable results in speeding up machining, saving wear and tear on tools and improving quality of finished parts, it is surprising that this metal tenderizing and normalizing technique is not much more widely practiced. If the 1951 Metal Show serves to strengthen this important link between metallurgy and machining, ASM can add one more well-earned feather to its cap.

PIONEER DIVIDING ENGINES: Among machines behind the scenes which have made possible the manufacture of modern machine tools and measuring instruments, are the so-called "dividing engines" for linear and circular scales and dials.

Great ingenuity went into the design of these dividing engines and several of them which were built many years ago were of such surprising accuracy that they could meet all but the most exacting demands of the present day.

Pratt & Whitney—back in the early 1880s—turned to an astronomer for help in translating official standards of length into commercial standards and reproducing and subdividing these standards for shop use. The astronomer they called upon was Prof. William A. Rogers of Harvard University, who with the practical help of his nephew George M. Bond, developed the famous Rogers-Bond comparator.

Rogers and Bond side stepped all doubtful standards of length and went back directly to the Imperial Yard in London and the Standard Meter in Paris.

At the Pratt & Whitney plant in West Hartford, a check recently was made of a 24-inch measuring machine built in 1908 to Rogers-Bond standards. It was found to be accurate to 0.00001-inch. That is good even in terms of 1951 limits of accuracy.

Tough Coating Opens Way to

New Uses of Porcelain Enamel

SHOCK resistant porcelain enamel coatings are being applied to nonpremium steel in the one-coat Ti-Loc process developed by Strong Mfg. Co., Sebring, O. It is another pioneering step for the refrigerator components manufacturer as Strong was one of the first companies to make the shift from three coat porcelain enamel to the one coat white over ground coat method in March, 1946.

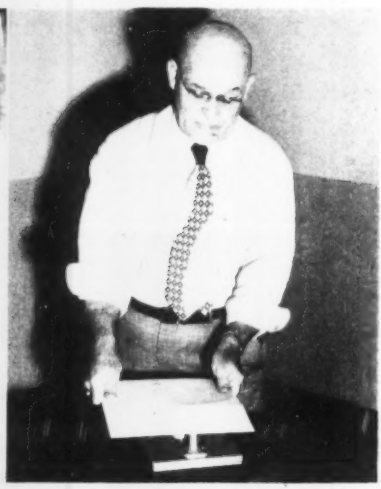
So far the company has put only one item into production using the Ti-Loc process, a fluorescent lighting fixture. Thousands of these fixtures have been delivered to Westinghouse Electric Corp.'s lighting division in Cleveland and have passed the specification set by the Electrical Testing Laboratory as to appearance, reflectivity, intensity of illumination, etc. Small quantity test runs on refrigerator trays, range tops and similar appliance items indicate these are other areas where the process will be used in the near future.

No Rush—Before the company expands its application of the one coat white titanium cover coat to these other lines, it wants to be sure there are no production bugs remaining that would cloud future growth. William C. Miller, executive vice president, puts it this way, "We've been a regular supplier to companies like General Electric, Westinghouse, Hotpoint, Seeger, Philco and Gibson for many years and have built a reputation for delivering a product that meets their exacting specifications. If we rush into production now and some flaw develops in the manufacturing setup, then we would put doubts in the minds of present and future customers as to the effectiveness of our process. We don't want to make claims, we want to deliver the goods."

Will Take Beating—This process will make porcelain enamel more competitive with other type finishes than it has ever been, company engineers believe. Production of a completely satisfactory porcelain enamel finish at a thickness of 0.003-inch reduces chippage from mechanical shock to a minimum. Demonstrations of its toughness for prospective customers cover drilling, punching, shearing and sawing the coated stock and the striking of sharp blows with the traditional blunt objects. Through all these tests plus twisting and bending, the enamel preserves a smooth unbroken surface.

It is possible to sucessfully apply all commercial type titanium opacified enamels directly to the steel but the softer, lower firing enamels have been more successful than the conventional enamels. This indicates that the lower firing temperatures will be in order in future utilization of this process. As the firing temperatures come down below the critical range of the steel, it will eliminate another major production problem, the warping of complicated shapes, and make possible the widely expanded use of porcelain enamel as a finish. Not only is this a big advantage technically speaking but it also holds great promise costwise. In addition to saving on labor and material because of the single application and firing, the manufacturer will be able to eliminate the reinforcing necessary at the present time to maintain alignment on the more complex shapes.

Gaining these advantages without sacrificing any of the rigid specifications expected from porcelain enamel such as good acid resistance, high reflectivity, excellent resistance to abrasion, resistance to thermal shock, color stability after firing, etc., opens a big market for the process. Products like kitchen cabinets, bathroom tiles and other items that require cutting or shaping on the job may soon be in the range of porcelain enamel.



Left — Shearing a sheet coated by the new process leaves a clean edge and does not damage the surface

Right — Test panel striking a steel ring in an impact test demonstrates ability of the coating to withstand a sharp blow of considerable force. Plate is bent but the coating is undamaged

THINSTEEL
TRADE MARK

puts more steel on your reel

The combination of extra-long coils (200# per inch of width and up) and more ft. per lb. in Thinsteel is a real aid to production scheduling. Because Thinsteel provides the maximum lineal feet of cold rolled strip steel per lb. for thickness specified, in the longest practical coils for the width involved, there are real opportunities to increase production, reduce manufacturing costs, and cut machine down time.

...more parts in your carts

The tangible evidence is found in the increased yield of finished parts per ton of Thinsteel processed. Characteristic of Thinsteel, because of CMP's precision processes, you suffer no footage loss due to oversize variation in gauge

ANYTIME

So, when you check your present yield, remember that with Thinsteel you can count on the extra footage that adds up to increased production. Of course, today, Thinsteel production is directed first to defense needs but whether for defense or regular civilian end-use manufacture, it is a helpful answer in stretching steel supply.

PRECISION COLD ROLLED C M P STRIP STEEL

the Cold Metal Products co.

YOUNGSTOWN 1, OHIO

New York • Chicago • Indianapolis • Detroit • St. Louis • Los Angeles • Cleveland

LOW CARBON, HIGH CARBON (Annealed or Tempered) *STAINLESS AND ALLOY GRADES, ELECTRO ZINC COATED ARE AVAILABLE FROM:*

THE COLD METAL PRODUCTS CO. of CALIFORNIA, 6600 McKinley Avenue, Los Angeles
Phone: PLeasant 3-1291

THE KENILWORTH STEEL CO., 750 Boulevard, Kenilworth, New Jersey
Phones: N. Y., COrtlandt 7-2427; N. J., UNionville 2-6900

PRECISION STEEL WAREHOUSE, INC., 4425 W. Kinzie, Chicago • Phone: COlumbus 1-2700

CAREFUL BATTERY MAINTENANCE

Reduces Truck Downtime

By J. E. VAUGHAN
Supervisor of Field Engineering
Gould-National Batteries Inc.
Trenton, N. J.

OHIO Injector Co., Wadsworth, O., manufacturer of cast steel, forged steel, iron and bronze valves, maintains a complement of 5 heavy-duty fork and platform trucks to handle the heavy metal valves through receiving, processing, storage, and shipping. This fleet of trucks handles the company's entire production and must, therefore, operate without downtime.

Guarantees Power Supply—To prevent downtime and keep trucks in best operating condition, the company observes careful battery-maintenance procedures. These procedures not only assure a dependable supply of power for truck operation, but also add months of life to the storage batteries.

Value of these trucks to plant operations is not realized until something goes wrong. Then extra men, extra time, and extra money must be thrown into the breach to maintain an integrated flow of production.

To keep the electric trucks always in operation, eleven 15-cell, 275-amp batteries are maintained. This is slightly more than two batteries per truck—a recommended ratio to prevent overwork of individual batteries and guarantee long life and avoid work stoppages.

Equipped for Mechanical Handling—One of the first battery-room requirements is adequate battery-handling equipment. The Ohio Injector battery room is provided with a trolley-mounted electric hoist which crosses the room on an overhead I-beam. This beam in turn is trolley-mounted at each end so it traverses the room lengthwise. The arrangement makes it possible to service any corner of the room with mechanical lifting equipment. Spreader-bars, as used here, should always be employed when lifting batteries. They avoid the tendency of the battery to bend as when lifted by a simple sling.

Truck batteries are checked at the beginning of each shift. Specific gravity readings are taken and if they indicate the battery needs charging, it is removed from the truck, put on charge, and a fresh battery installed.

Charging equipment comprises an 8 kw motor-generator set having four charging circuits, and a 2 kw set having one charging circuit. This permits one battery to be on charge at all times for each truck. Charging equipment is automatic, requiring only that the attendant plug the battery into the circuit. The control panel automatically regulates the initial charging rate, depending upon the state of discharge of the battery.

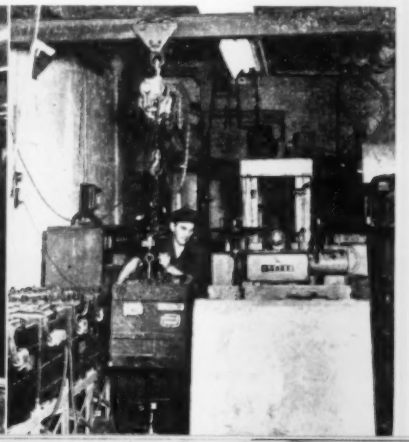
Automatic controls also adjust the charging rate to the finishing rate at the proper time. (Batteries are normally charged at a high starting rate and, when about 80 per cent charged, automatically switched over to a low finishing rate. This procedure permits batteries to be charged in a relatively short time, generally 8 hours, and at the same time avoids overheating.) The charge is automatically terminated when the battery is fully charged.

Charged Weekly—Once each week each battery receives an equalizing charge to maintain all cells in a uniform condition. This is a prolonged charge at the "finishing rate". The equalizing charge is given until four successive specific gravity readings taken at 1-hour intervals, are constant.

Battery water requirements are also checked weekly and distilled water added as required. Compressed air is provided in the battery room to enable the attendant periodically to blow the batteries clean.

An interesting technique is used by Ohio Injector to enable use of its standardized battery-size in a large 4000-pound truck. Two batteries are simply connected in parallel to (*Please turn to Page* 98)

Left—Platform truck brings castings for machining and removes skidloads of finished castings. Thin sheets are inserted between layers of castings on the skid to give the load stability. Hoist above truck has a special pickup element designed to lift heavy castings and position them in the machine



Right—Battery room has a trolley-mounted electric hoist which crosses the room on an overhead beam. This beam in turn is trolley-mounted at each end so it traverses the room lengthwise

THE BIRTH OF THE FUTURE

Our Research and Development Division

finds tomorrow's better way today. We turn die casting problems into die casting progress. Here the ablest men in the field work with the finest facilities to get the *right* answers . . . answers that save dollars and man-hours for manufacturers.

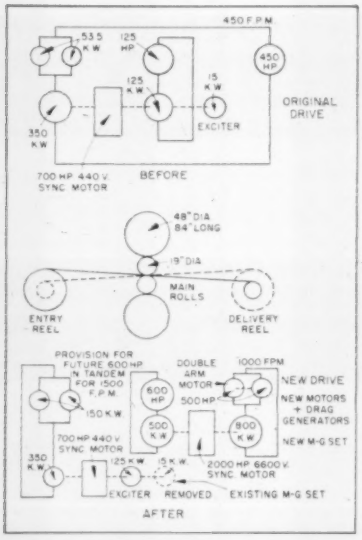
Our Research Department is at your service. We will be glad to discuss with you, without obligation, how die castings may make your product better, quicker, at lower cost.

CHARLES PACK
Director of Research, Vice President and Outstanding Scientist

DOEHLER-JARVIS CORPORATION

The World's Largest Producer and Finisher of Die Castings

PLANTS AT TOLEDO, OHIO • POTTSTOWN, PA. • GRAND RAPIDS, MICH. • BATAVIA, N. Y. • CHICAGO, ILL.
EXECUTIVE OFFICE: 386 FOURTH AVENUE, NEW YORK, N. Y.



Before and after drawing showing how a 19 and 48 by 84-inch sheet temper mill was repowered to increase its delivery speed from 450 to 1000 feet per minute. Suitable changes were also made in gear ratio. Courtesy Allis-Chalmers Mfg. Co.

Faster Mill Speeds Increase Rolling Capacity

Rolling mill delivery speeds have increased from 25 to 40 per cent during the last few years due mainly to use of new and improved motors and controls . . . Many mill engineers are turning to rectifiers of the sealed mercury arc-type for supplying direct current for many of their electrolytic processes and variable speed drives . . . Industry spokesmen foresee ample finishing capacity to handle their ever-increasing ingot capacity

By DAN REEBEL
Pittsburgh Editor

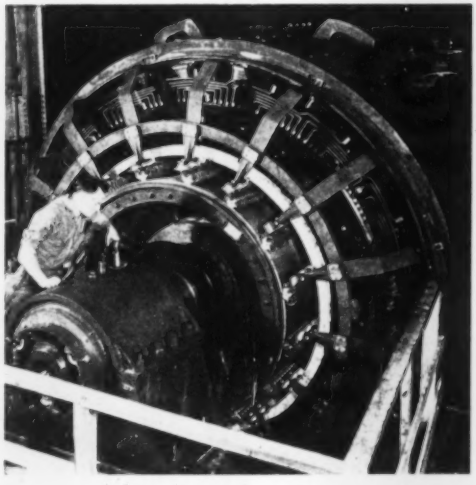
MEETING today's demands for increased production at lowered operating costs, steelmen are stepping up delivery speeds of both new and existing rolling mills and auxiliary processing units by use of improved higher horsepower drive equipment.

According to spokesmen of the American Iron & Steel Institute, delivery speeds of a large majority of our rolling mills, from bloomers to finishing facilities, have been increased approximately 25 per cent during the past few years. New motors and controls on continuous sheet and plate mills have greatly upped productivity, in some cases 40 per cent.

Today's delivery speed for hot strip mills varies approximately from 2000 to 3000 feet per minute and is fairly stable. However, on other mills the trend is to much higher operating speeds. Today's top speed for rod and wire is approximating 5000 fpm; for cold reduction mills, 7000 fpm; and of temper rolling units, 5000 fpm. Speeds of auxiliary equipment such as slitting or side trimming lines, cleaning lines and electrolytic tinning lines are gradually being increased upward by changes in drive equipment.

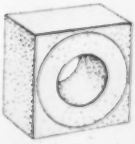
Allis-Chalmers engineers explain that the most practical solution to raising steel mill output as fast and economically as possible, is the speedup of mill drives by rearranging first-line steel producing and processing machinery, changing gear ratios and augmenting both with new and more powerful electrical equipment and controls to make the best use of the greater available speeds.

Regulators Replaced—They increased output of a large midwestern hot strip mill 20 per cent to 900 fpm by changing the armature voltage from 600 to 650 volts, and by raising the rpm of the motor itself. As the increased speed required more effective and delicate control, the old direct-acting rheostatic regulators were replaced with rotating regulators which offered the needed faster ratio response to correct voltage regulation speed and tension of strip or to balance load of two parallel machines. They point out the essential difference between the two is that the mechanical direct-acting rheostatic type has a



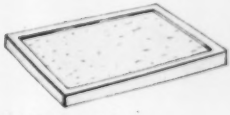
This largest twin-drive unit ever built for the steel industry will have a continuous torque rating of 1,400,000 lb ft and a maximum torque rating of 3,850,000 lb ft. It will consist of two 4000-hp, 30 75-rpm, 600 v reversing motors; one directly connected to the top work roll and the other to the bottom work roll of the mill. Courtesy General Electric Co.

We're finding new uses every day for versatile **KAOCAST**

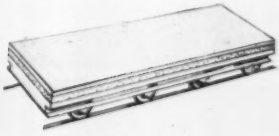


KAOCAST Burner Blocks

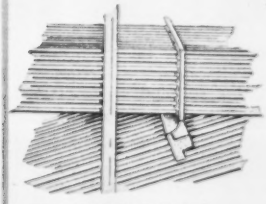
KAOCAST Covering for Water Cooled Furnace Tubes



KAOCAST Door Lining



KAOCAST Car Top



KAOCAST Boiler Baffles

Even our Field Engineers are surprised to discover the amazing variety of uses for versatile Kaocast. This unique 3000 degree refractory castable has been put to work in scores of imaginative applications where it has paid off in lower installation costs, faster repairs, longer service life. Here are a few examples:

- **Kaocast replaced firebrick in door linings . . . lasted 3 to 6 times as long, cut costs in half.**
- **In a tunnel kiln, ordinary castables used for covering car tops crumbled after a few trips. Kaocast stayed on the job for 30 trips without deterioration.**
- **Versatile Kaocast proved "better than anything previously used" for piers of a stoker-fired boiler.**
- **This jack-of-all-refractories performs so well that one central station keeps a large stock on hand for miscellaneous jobs.**

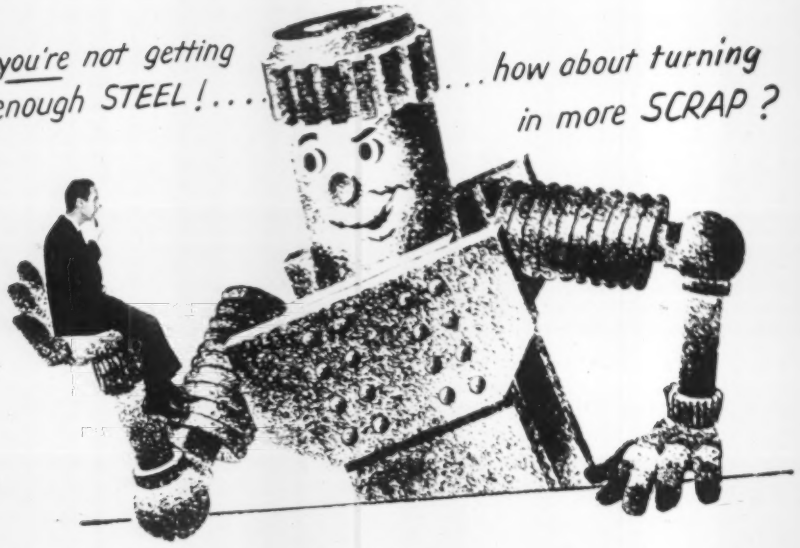
Are you missing a money-saving opportunity to use versatile Kaocast? Ask your B&W Field Engineer to give you additional facts and figures . . . to help you profit with Kaocast. • KAOCAST is another important refractories development by B&W engineers who have continuously established new standards in industrial furnace refractories for the past 30 years.

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 85 LIBERTY ST., NEW YORK 6, N.Y.
WORKS: AUGUSTA, GA.

R-401

B&W REFRACTORIES PRODUCTS—B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick B&W Refractory Castables, Plastics and Mortars • OTHER B&W PRODUCTS—Stationary & Marine Boilers and Component Equipment... Chemical Recovery Units . . . Seamless & Welded Tubes . . . Pulverizers . . . Fuel Burning Equipment . . . Pressure Vessels . . . Alloy Castings



There's only one quick way to get more steel!

. . . get more SCRAP to the mills, at once

LET'S be realistic about the scrap shortage. The need for scrap is desperate. It threatens to hamper our whole National Defense effort—and it vitally concerns *you* because it boils down to this:

Unless 100,000 tons of industrial scrap roll into the steel mills every day, steel production will drop, and there'll be *less* steel for everyone—you included.

On the other hand, if more scrap is turned in, more steel will be turned out—and the more steel that's made the more steel *you'll* get.

So—if you want more steel—do your full share in getting your scrap back to the mills. Comb through your plant, again and again. Tap every source of dormant scrap. Dig out every retired machine that you can possibly spare and rush it to your scrap dealer. Rip out any old rails and switches that are rusting away on unused sidings—and scrap them. Scrap your antiquated dies, jigs and fixtures, your worn-out tanks and boilers that are gathering dust in some forgotten corner. Make sure that not a single pound of scrap is by-passed. Sell it—ship it. It means good money for you, more scrap for the Nation's scrap pile, and more steel for *everyone*.

• • •

Remember—the Nation's productive effort depends primarily on steel—and steel depends on SCRAP . . . *your* scrap. Turn it in—NOW.

You'll find your local scrap dealers listed in the yellow pages of the phone directory.

This page would ordinarily be used to tell you about

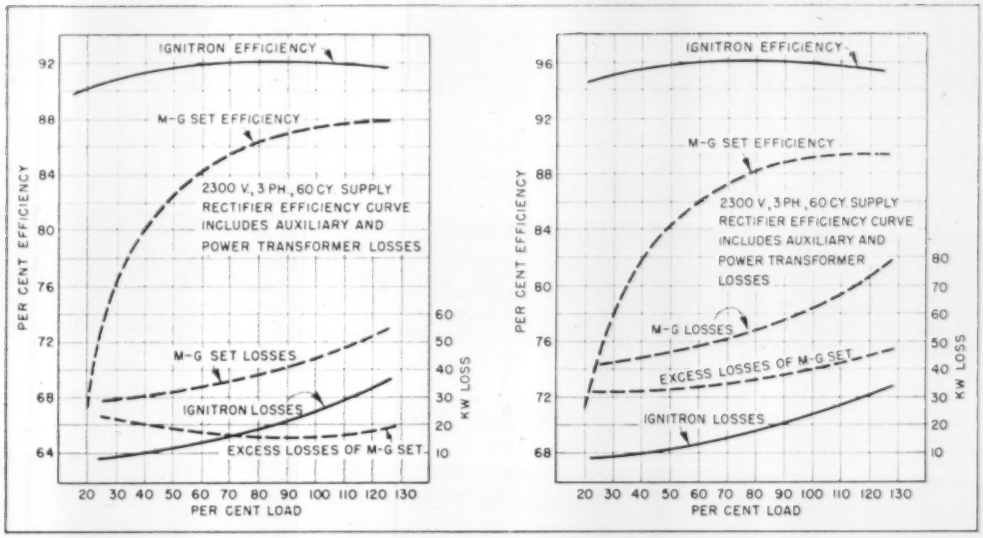
NATIONAL SEAMLESS PIPE AND TUBES

but, because without SCRAP we cannot produce steel, we are asking instead for your all-out help in getting more SCRAP to the mills.

NATIONAL TUBE COMPANY, PITTSBURGH, PA.
(Tubing Specialties Division)
COLUMBIA STEEL COMPANY, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

1-1902

UNITED STATES STEEL



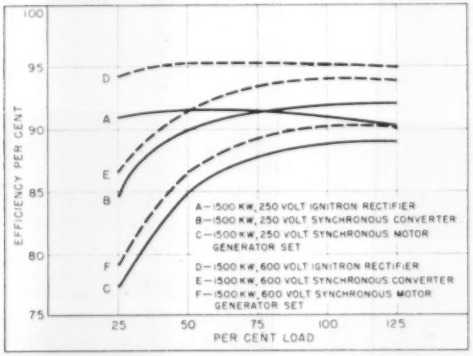
Efficiency curves of a sealed Ignitron mercury arc rectifier and an 80 per cent P.F. synchronous motor-generator set for a 300-kw, 250 v unit and a 500-kw, 600 v unit, graphs 1 and 2 respectively. These show the efficiency advantage of the rectifier throughout the load range. Also the kw loss curves indicate the actual kw saved when rectifiers are used instead of motor-generator sets. Courtesy Westinghouse Electric Corp.

constant speed of response under all conditions, while with the rotating regulator type it increases in ratio with the per cent correction required. Rotating regulators make a 50 per cent correction five times as fast as one of 10 per cent, while the mechanical contactor would correct both faults in same amount of time.

On another sheet temper mill they materially increased output by speeding up its drive and adding the necessary electrical equipment. Gear ratio changes were made to a drag generator on the mill's entry side to permit high-speed operation within the mechanical limitations of the electrical unit. The original main roll drive motor was moved to the delivery reel's drive and the original single-stand drive changed to a 2-stand mill with entry and delivery tension devices. Electrical equipment consisted of a new single armature and twin-motor drives powering both top and bottom rolls of the tension devices.

Reels Redesigned—Another interesting Allis-Chal-

Efficiency advantage of rectifiers over synchronous converters and motor-generator sets are shown in these curves. Courtesy Westinghouse Electric Corp.

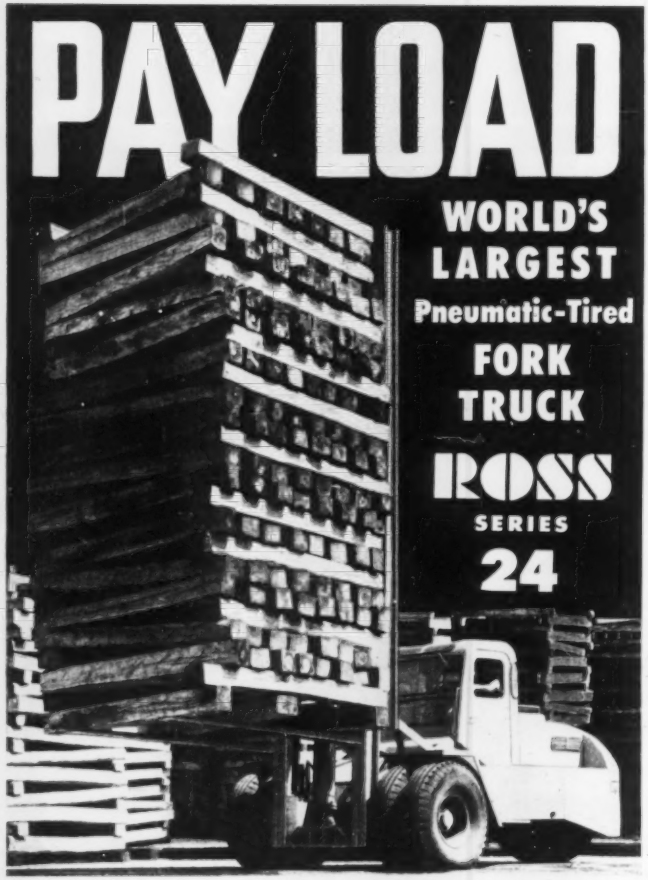

EFFICIENCY PER CENT
PER CENT LOAD
A—1500 KW, 250 VOLT IGNITRON RECTIFIER
B—1500 KW, 250 VOLT SYNCHRONOUS CONVERTER
C—1500 KW, 250 VOLT SYNCHRONOUS MOTOR GENERATOR SET
D—1500 KW, 600 VOLT IGNITRON RECTIFIER
E—1500 KW, 600 VOLT SYNCHRONOUS CONVERTER
F—1500 KW, 600 VOLT SYNCHRONOUS MOTOR GENERATOR SET

mers installation increased capacity of a single-stand sheet mill from 400 to 1000 rpm by replacing all drive motors with new ones to provide the necessary heavy repowering. Both entry and delivery reels had to be redesigned because of the greater speeds to be handled. The existing M-G set was used to support the entry reel. A three-machine M-G set was added to support both the main roll and delivery reel drive.

Another 84-inch single-stand 4-high sheet temper mill was increased from 450 to 1000 fpm by their repowering, as shown in the before and after drawing and by making suitable changes in gear ratio. The revamped mill has provision for future increase to 1500 fpm.

Mechanical modifications include a new entry reel of modern design which is a complete mechanical assembly providing its own thrust bearing and gear box arranged for coupling to drag generators mounted on a suitable base extension. The old design incorporated thrust bearings and gear reducer made integral with the drag generators. This had mechanical limitations as to amount of thrust and weight of coil to be carried by overhung cores. It also limited usability of existing equipment for revamp. The new design provides greater capacity and possibility of using conventional design drag generators with standard bearings.

Delivery Speeds Soaring—Speeds of new mills being installed today are becoming faster and faster. Examples are General Electric's powering of a 48-inch



HANDLES LOADS WEIGHING 26,000 LBS.- 72" WIDE

•

SPEEDS HANDLING OF BILLETS, BARS, IN-PROCESS AND FINISHED MATERIALS

•

HUGE 14.00-20 TIRES, PLENTY OF WEIGHT ON DRIVING WHEELS - MINIMUM YARD SURFACING REQUIRED

•

TAKES TOUGHEST OPERATING CONDITIONS IN STRIDE

•

You'll want full details on this giant fork truck . . . designed to further speed mass handling of heavy materials and reduce costs even more. Write today.

Rely On ROSS

THE ROSS CARRIER COMPANY

Direct Factory Branches and Distributors Throughout the World

450 Miller St., Benton Harbor, Michigan, U.S.A.

5-stand tandem cold reduction mill having a total of 22,650 hp in the drive capable of delivering material at 7000 fpm. Fastest of its width, will be an 80-inch 4-stand tandem cold reduction mill delivering at over 3000 fpm. This drive is also 22,650 hp. Equipment for Pittsburgh Steel's new hot-strip mill will include a GE 6000-hp reversing roughing mill drive and a finishing mill drive comprised of four 4000-hp dc motors. In place of the customary M-G sets, the finishing mill drive will be powered by two 5000 kw mercury arc rectifiers. Having no rotating parts, these rectifiers produce high efficiency at low maintenance cost for the type of operation, according to GE engineers.

Westinghouse drive equipment at the new Fairless Works of the United States Steel Co., includes a double armature twin drive totaling 12,000 hp which will be used for the main drive of the 45-inch slabbing mill, with a 4000-hp motor for the edging rolls. A 13,500 kw capacity M-G set will supply power for the combined drives. This will be the world's most powerful slabbing mill. On the West Coast, Kaiser is speeding-up its blooming mill—previously a bottleneck in their production facilities—to realize more rolled tonnage.

Speedups handled by Westinghouse include a 4-stand tandem cold reduction mill with an original top speed of 1500 fpm. To realize more production from the unit, a new drive was purchased about twice the horsepower of the original and speed increased to 3100 fpm. Originally, an M-G set supplied the entire mill but now feeds the fourth stand only. To complete the job, they used three generators and an additional M-G set.

They also upped a cleaning line whose original speed was 800 fpm. Six years ago it was advanced to 1200 fpm by installation of new motors and revamped control. Today, it has reached a peak of 1650 fpm by use of new generators. This was accomplished by putting more horsepower all through the drive utilizing as much of the original equipment as possible.

Controls Up Output—Westinghouse increased production 20 per cent on a blooming mill by the addition of new rotating-type regulator controls only. This increased speed of response of the main and auxiliary drives. On an electrolytic tinning line originally designed for 1000 fpm at 230 v dc, they upped speed of output to 1300 fpm by increasing voltage to 300. This is only possible where existing motor drives are suitable for higher speeds. Today, the operator by improvement

TEXTILE MACHINE PART LASTS THREE TIMES LONGER... *when made of* *Republic Alloy Steel*

NOT ALWAYS is it possible to improve a product and at the same time cut its cost. But the Warner & Swasey Company did just that by changing design of a textile machine part—a change made practical through the use of Republic Cold Drawn Alloy Steel Bars with Carbon Correction Annealing.

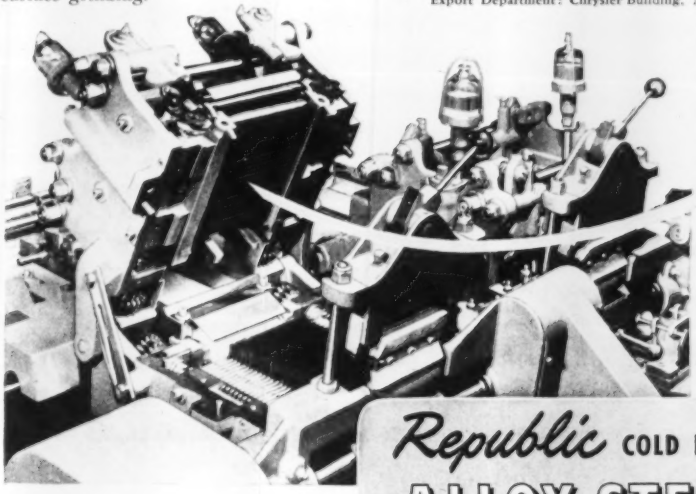
The part, known as a "faller bar," looks like a comb, and is used to control nylon, rayon and wool fibres in the drawing process. When the design was changed from three-piece to one-piece construction—exclusive of the needles—welding and weld grinding were eliminated. Furthermore, the fine cold drawn finish free from decarburization required no surface grinding.

New high strength of the part permitted an increase in machine speed. Wear was reduced—bending and twisting practically eliminated. Rejects were reduced.

And—probably of greatest importance—life of the part was increased more than 200%.

Maybe the high strength, toughness and hardenability of Republic Alloy Steels combined with the advantages of cold drawing and carbon correction are just what your product needs. Why not invite a Republic metallurgist in to talk it over?

REPUBLIC STEEL CORPORATION
Alloy Steel Division • Massillon, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N.Y.



Republic COLD DRAWN
ALLOY STEEL BARS

REPUBLIC STEEL

Other Republic Products include Carbon and Stainless Steels—Sheets, Strip, Plates, Pipe, Bars, Wire, Pig Iron, Bolts and Nuts, Tubing

in this process has upped this speed to 1700 fpm.

Most of the recently completed or contemplated expansion in the steel industry has been in primary capacity. Very little has been in the finishing end. However, operators will be able to finish all their added output through small improvements in process, addition of reheating facilities, faster motors and speedup of delivery from new and existing rolling and auxiliary processing equipment. Improved production planning and standardization of mill procedures are also vital factors in the theoretical boosting of finishing capacities. Standardization of operating procedures has added its weight to the production total. Time necessary to perform repetitive routine operations has been studied so as to eliminate blanks in time schedules.

Sees Adequate Finishing Capacity— Generally speaking, industry spokesmen believe their over-all finishing capacity, especially for hot-rolled sheet and strip, will be more than adequate to handle the additional steel made available by new and proposed ingot production facilities. Many are in the midst of installing or enlarging rolling mill facilities which will be adequate to handle all ingots they can produce in their respective steelmaking units. Jones & Laughlin's board chairman states that in the period immediately following World War II the greatest part of the industry's capital expenditures was for improvement and expansion of finishing facilities. Expansion in basic ingot capacity has only recently taken place. Pittsburgh Steel's president firmly believes his industry will maintain an adequate relationship between its finished product capacity and ingot capacity, if for no other reason than that it has been the sad experience of those steel companies which have had an excess of semifinished capacity that there was little, if any, profit return on semifinished products, per se. At Republic Steel in Cleveland, a very substantial capacity increase was necessary in their strip mill to enable them to process all ingots available from their increased steel capacity. They also had to provide the entire additional annealing capacity, and were forced to install many more blooming mill soaking pits.

Rectifiers in Broader Use — Many rolling mill plants are turning to sealed mercury arc rectifiers for supplying direct current to their variable speed drives and many electrolytic processes in preference to the time-honored motor-generator units. Consensus of users is that initial investment and installation costs are slightly lower and efficiency somewhat higher. The rectifiers are particularly suitable for hot strip and rod mills running at essentially continuous speeds and requiring no regenerative braking. They are not indicated for cold reduction and temper mills where regenerative braking is necessary, or other applications depending upon a wide range of operating speeds. General Electric engineers note that steel mills are large users of dc power because superior characteristics of dc motors and controls dictate their wide use not only for the majority of main roll drives but also for cranes and other important mill auxiliary drives. Since power is generated or purchased and distributed in the form of alternating current, power conversion to direct current at points of utilization becomes essential.

Sealed mercury arc rectifiers have higher conversion efficiencies than M-G sets over the entire load range. A 250-v rectifier effects savings ranging from 4 to 18 per cent in over-all conversion efficiency. Units of this type require only ½ to 1/5 the power of an M-G set at idling speed. Mo-

IT'S NO RUMOR—
IT'S A FACT!

EARLY DELIVERIES
of machine tools for . . .

- THE TOOL ROOM!
- THE MACHINE SHOP!
- THE PRODUCTION LINE!
- HEAVY MANUFACTURING!

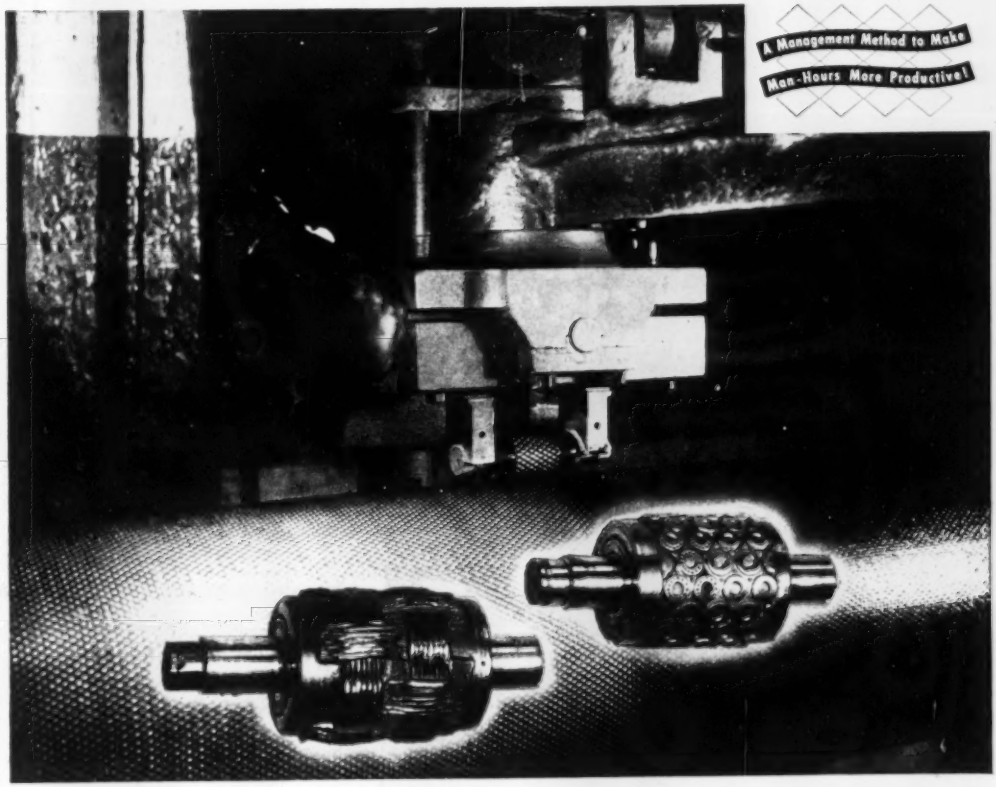
Additional information and quotations furnished promptly. We invite your inquiries.

REPRESENTING THE BETTER WESTERN GERMAN MACHINE TOOL BUILDERS

SALES OFFICES IN PRINCIPAL CITIES

Executive Offices: 21 West Street, New York 6, N. Y. • Service Center: 4220 Prospect Ave., Cleveland, Ohio

KURT ORBAN COMPANY, INC.



How to Put Delicate Patterns Through a 5-Ton "Wringer", Successfully

These knurling mills, made from No. 11 Special (Water-Hard) Tool Steel, press artistic patterns into large steel rolls for embossing cloth, paper and plastic. Here's what was required of the tool steel: It had to be hard enough to prevent upsetting; tough enough to prevent delicate edges from breaking under operating pressures up to 5 tons. Patterns on the mills were quite fragile and sections as deep as $\frac{1}{16}$" could not collapse. Further, the steel had to heat treat with very little warpage.

But picking the proper steel wasn't as tough as you may imagine. For the Carpenter Matched Set Method not only indicated the one *best* steel for the job but enabled production management to "call its shots" . . . have the mills produce the required number of patterns on schedule, with less costly downtime.

For any plant making or using tools and dies, the Matched Set Method offers even more advantages than simplified selection. You benefit from lower tool steel inventories, heat treating economies, simplified toolroom and production procedures. To discover how it can work for you in your plant, write for the new booklet "How to Get Better Tool and Die Performance". THE CARPENTER STEEL CO., 139 W. Bern St., Reading, Pa.

Export Department: Carpenter Steel Co., Reading, Pa. — "CARSTEELCO"

Carpenter

MATCHED TOOL & DIE STEELS

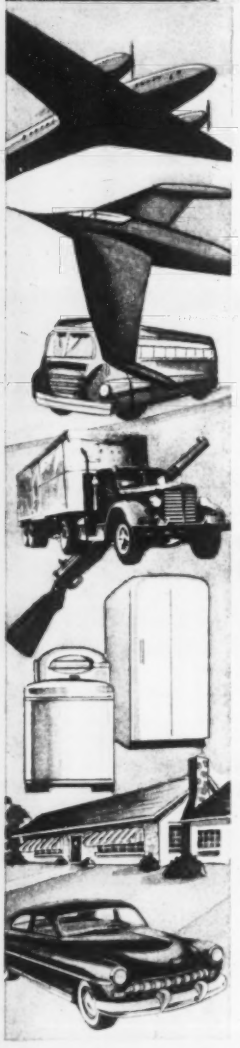
More than top-grade steels . . . a Method to keep tooling and production on schedule!

For your convenience, Carpenter carries warehouse stocks in principal cities throughout the country

CHEMICALS ACP PROCESSES

phosphate coating chemicals

TO MAKE YOUR PRODUCT DURABLE



PAINT BONDING

"GRANODINE"® forms a zinc-iron phosphate-coating bond on sheet metal products—automobile bodies and fenders, refrigerator cabinets, etc.—for a durable, lustrous paint finish.

"LITHOFORM"® makes paint stick to galvanized iron and other zinc and cadmium surfaces.

"ALODINE",® the new ACP protective coating chemical for aluminum, anchors the paint finish and protects the metal.

RUST PROOFING

"PERMADINE",® a zinc phosphate coating chemical, forms on steel an oil-adsorptive coating which bonds rust-inhibiting oils such as "Granoleum."

"THERMOIL-GRANODINE"® a manganese-iron phosphate coating chemical, forms on steel a dense crystalline coating which, when oiled or painted, inhibits corrosion.

PROTECTION FOR FRICTION SURFACES

The oiled "THERMOIL-GRANODINE" coating on pistons, piston rings, cranks, camshafts and other rubbing parts, allows safe break-in operation, eliminates metal-to-metal contact, maintains lubrication and reduces the danger of scuffing, scoring, galling, welding and tearing.

IMPROVED DRAWING AND COLD FORMING

"GRANODRAW"® forms on pickled surfaces a tightly-bound adherent, zinc-iron phosphate coating which facilitates the cold mechanical deformation of steel, improves drawing, and lengthens die life.

Send for descriptive folders and Government specifications chart on the above chemicals. Write or call for more information on these products, and advice on your own metal-working problem.

Pioneering Research and Development Since 1914

AMERICAN CHEMICAL PAINT COMPANY

AMBLER, PA.

Manufacturers of Metallurgical, Agricultural and Pharmaceutical Chemicals

mentary dips in supply voltages have no effect on the operation of a continuously burning excitation arc. Another advantage is that mercury arc rectifiers are free of noise, vibration, windage losses, and brush wear.

Installation Simplified — Rectifiers cost less than M-G sets because they are smaller and extremely simple. Being completely factory-assembled units, installation consists merely of connecting the control, power leads and water connections to ready them for operation. Since there is a minimum of moving parts, no special foundations are necessary. Compactness of the unit also conserves valuable floor space.

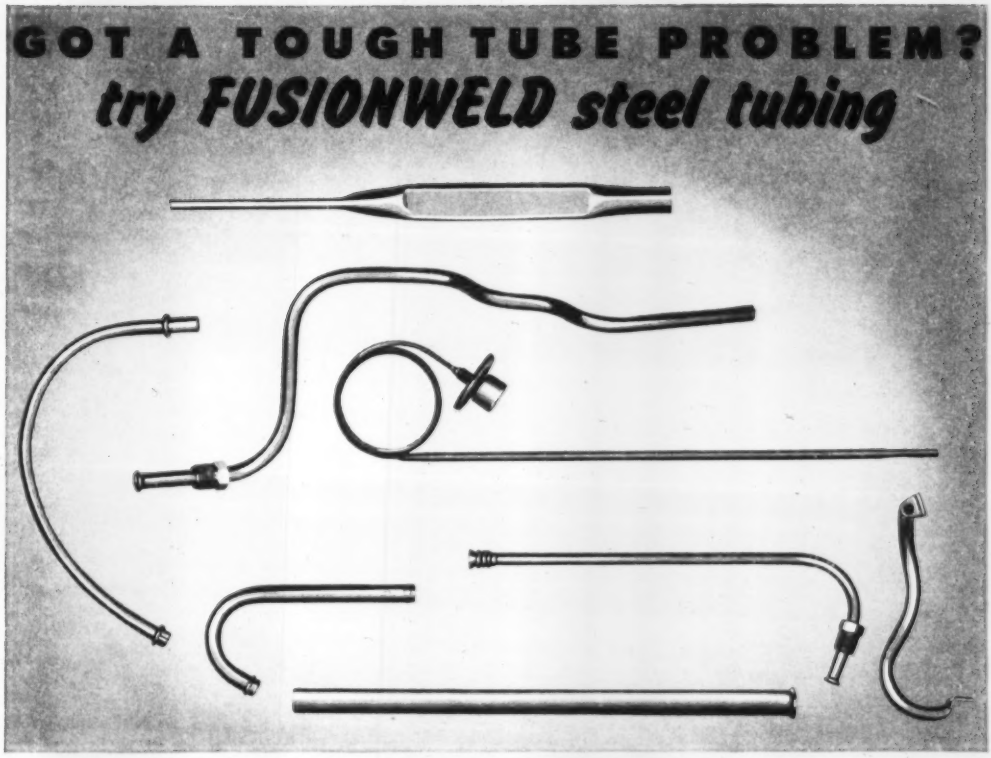
Allis-Chalmers steel mill engineers state that compared with M-G sets, their type of sealed mercury arc rectifiers are virtually maintenance-free. The only moving part is a vacuum pump, thus they are remarkably quiet in operation. At most, the only maintenance required is an annual check of the unit's interior and the possible replacement of a few gaskets. Motor-generator sets on the other hand must be lubricated regularly; commutator, brushes and bearings must be repaired or replaced because of wear; coils and insulation must also be inspected and maintained.

Westinghouse engineers recently reported that industry in general—wherever there is need for power conversion in the range below 3000 v—selects rectifiers because of their ease of installation, availability factor and high overload capacity. Low operating costs in addition to low maintenance costs help reduce the total cost of direct-current power. When utilities convert power from ac to dc, the cost per kilowatt per output is reflected directly in operating profits. As a result, the unparalleled high efficiency of rectifiers is a factor in the noteworthy swing to this type of equipment. Momentary overloads and short circuits won't damage the rectifiers. Voltage can be controlled easily and economically.

Advantages of Rectifiers — Summation of rectifiers' advantages is as follows: High efficiency, ease of installation, no starting inrush, unattended operation, low maintenance cost, no special foundations required; factory-assembled, no special air cooling requirements, quiet operation—no vibration, require less floor space per kilowatt than any other conversion equipment, and immediate availability for service at any load demand.

Generally speaking, rectifiers may be applied for any voltage between 125 and 600 dc, providing the kw rating does not exceed certain limits

GOT A TOUGH TUBE PROBLEM?
try FUSIONWELD steel tubing



MORE FATIGUE RESISTANT
•
HI-PRESSURE TESTED
•
EXTREME DUCTILITY
•
SUPERIOR TENSIBILITY
•
GREATER ECONOMY

CURRENT CATALOG ON REQUEST

To simplify a problem is to solve it. This has been successfully done with FUSIONWELD Steel Tubing. Many "big name" manufacturers have discovered a solution to their most complicated tubing problem with AVON FUSIONWELD.

One of these might be price. Our tubing answers that with some brand new economies. Another problem might be securing the best non-porous, hi-pressure resistant tubing. FUSIONWELD satisfactorily stands up to the toughest tests on that score. Or your problem may be one of tough angle bending, flaring, sealing, swaging, expanding, threading, beading, piercing, drilling, soldering or cutting. FUSIONWELD again affords the answer—with ductility—plus! Greater fatigue resistance solves another performance problem for many users with comparative vibration tests proving FUSIONWELD tops on that score. That's why FUSIONWELD is called "The Tubing With a Future!"

We manufacture FUSIONWELD steel tubing and fabricate to your special needs and specifications. Inquiries solicited—samples submitted. May we hear from you?

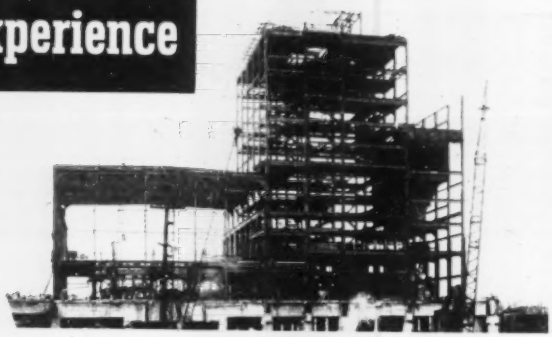
3/16" O.D. to 5/8" O.D. PLAIN OR TERNE COATED

"The Tubing With a Future"

AVON TUBE DIVISION

HIGBIE MFG. COMPANY • ROCHESTER, MICHIGAN

Experience



Fabrication and erection of steel for more than 25 power plants in every section of the country is Ingalls' record of accomplishment . . . a record which reflects the experience and skill of the nation's largest independent structural steel fabricator.

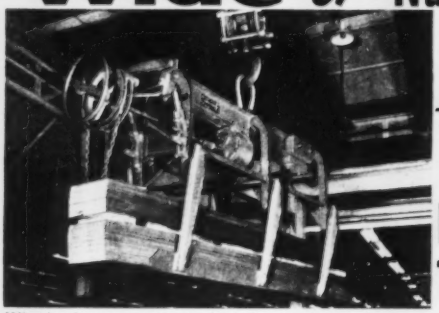
Phone, wire or write for technical help in solving your power plant construction problems.

The Ingalls Iron Works Company

BIRMINGHAM, ALABAMA

SALES OFFICES: NEW YORK, CHICAGO, PITTSBURGH

Wide *or* Narrow...

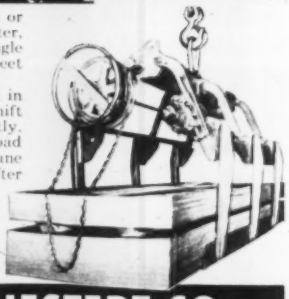


1 C-F LIFTER HANDLES THEM ALL

Whether your production requires a few or many widths of sheet steel, 1 C-F Lifter, with its wide range of jaw and carrying angle adjustments will probably meet all your sheet handling requirements.

Adjustments are made by the operator in a few seconds, permitting the Lifter to shift from wide to narrow sizes almost instantly.

Because it can pick up, carry and unload more loads per hour, using less man and crane time than any other method, a C-F Lifter will soon pay for itself.



Bulletin SL-25 gives you the complete story of C-F Lifter advantages to you. Ask for it today. There's no obligation.

CULLEN-FRIESTEDT CO.

1308 South Kilbourn Avenue • Chicago 23, Illinois

prescribed by the manufacturers. Higher rated units are available as required. Also 3-wire units for 250/125 v service may be supplied. If voltage is below 250 however, efficiency and first cost are generally the same as for M-G sets.

Reduces Truck Downtime

(*Concluded from Page 86*)

supply the extra current demanded. If a larger battery was resorted to, extra charging facilities would have had to be provided.

Daily and weekly battery check-ups keep attendants aware of each battery's condition at any given time and enable them to make necessary adjustments, repairs and replacements in ample time to prevent work stoppages and to gain maximum efficiency and life from the silent power supplies.

Accidental Burns Eliminated

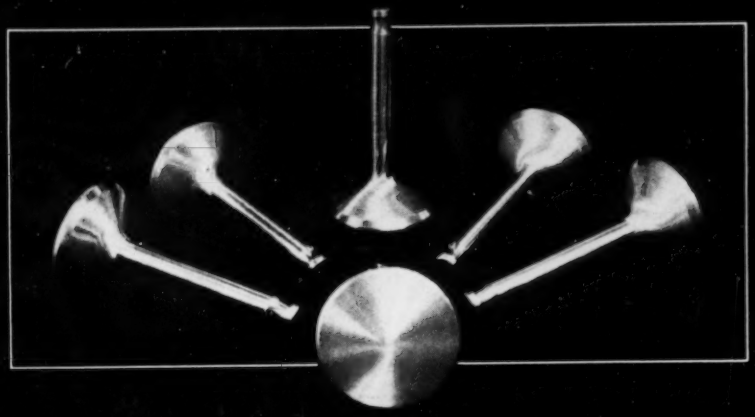
Minimum man-hours lost through on-the-job accidents is the constant objective of operating managers and safety engineers in steam and electric power generating plants. Although its most common function is to cut heat loss, thermal insulation has helped up-to-date power plants maintain exceptional safety records by preventing accidental burns where high-temperature equipment is located at floor level in working areas frequently used by employees.

Engineers at Long Island Lighting Co.'s 170,000-kw Glenwood power station, for example, anticipated the danger of accidental burns where a vertical pipe line containing 350° F ash passed only a few inches from the right handrail of steps. The possibility of burns was eliminated by covering the 8-inch line with $1\frac{1}{2}$-inch-thick molded-type pipe insulation and a $\frac{1}{2}$-inch layer of mineral wool cement up to about 6 feet above floor level. The pipe insulation was finished by covering the mineral wool cement with a single layer of asphalt paper and 10-ounce canvas glue-sized and painted.

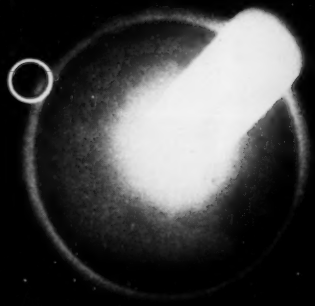
Boiler Numbers Restored

Corrosion has a way of affecting metal in the most annoying manner, at any time, but particularly when it obliterates the identification numbers on a boiler shell. This occurred recently on a crane boiler. Without proper identification licensing authorities were unable to start their inspection.

At this point Sam Tour & Co. Inc., consulting engineers and metallurgists, were called in. The boiler insul-



When minimum specs hit tops...



RADIOGRAPHY helps meet them

Newest developments in piston aircraft engines put stern demands on exhaust valves. Specifications have climbed toward perfection. Even a tiny irregularity, chip, fold, or flaw cannot be tolerated.

So the manufacturer radiographs each valve. It is the one way to disclose internal conditions without destroying the part—the one way to release only products of highest quality.

Radiography has become a dependable means of gaining a reputation for constant top-quality work. It forestalls imperfect products—frequently suggests changes in operations that assure higher yields in production runs.

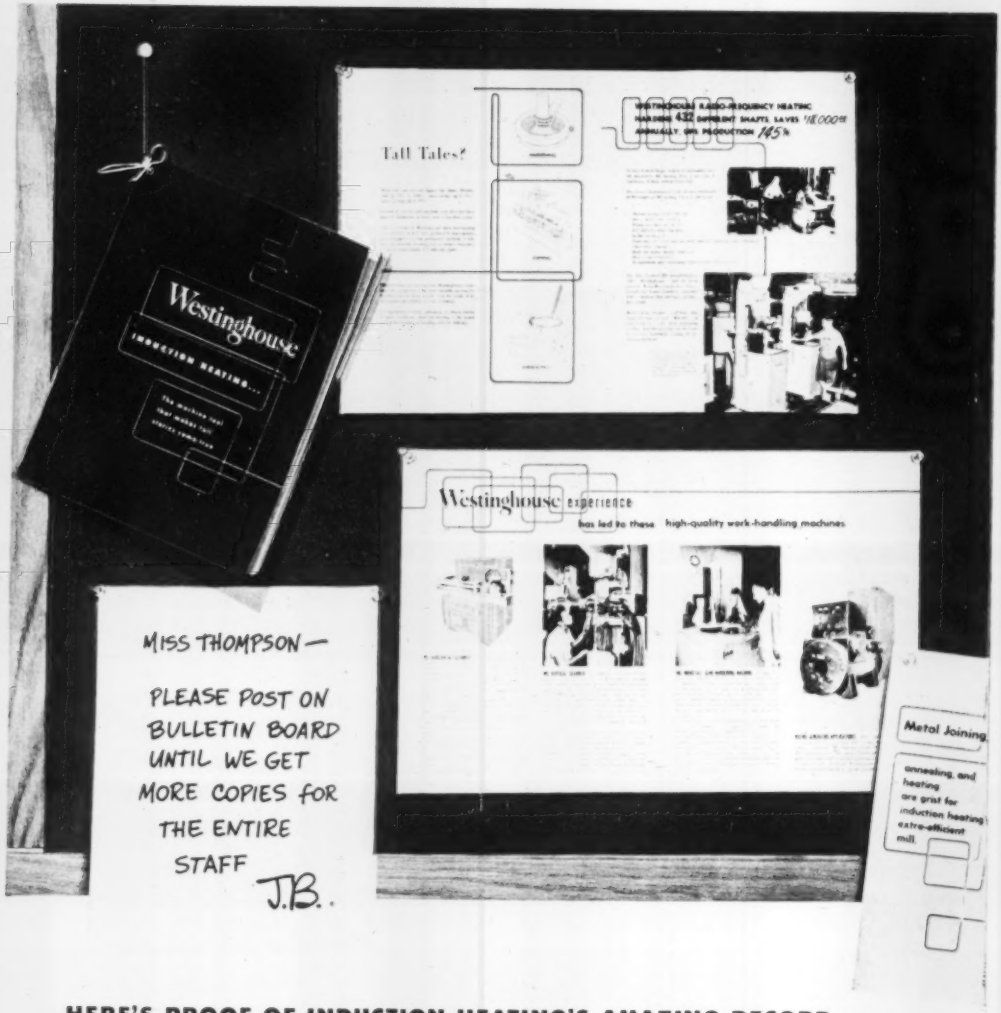
Ask your x-ray dealer to show you how radiography can increase your production and improve quality. Send for a free copy of "Radiography as a Foundry Tool."

EASTMAN KODAK COMPANY
X-ray Division
Rochester 4, N. Y.

Radiography...

another important function of photography

Kodak
TRADE-MARK



HERE'S PROOF OF INDUCTION HEATING'S AMAZING RECORD—

Actual case histories of hardening, brazing, soldering, and annealing installations show how the RF process has meant increased production (as high as 2000%), lower costs (as much as 90%), and a higher quality product for many of America's leading manufacturers. It's an amazing story — with facts and figures released by the companies themselves — and results that speak for themselves. See how these manufacturers' experiences may parallel your own . . . how RF Heating may help achieve production efficiency in *your* plant.

Send for this free booklet today — ask for B-4782. Write Westinghouse Electric Corporation, Department S-18, 2519 Wilkens Avenue, Baltimore 3, Maryland.

YOU CAN BE SURE... IF IT'S

Westinghouse

INDUCTION HEATING

ation was removed from around the area at which the numbers were thought to exist. This area was cleaned and then given an acid etching treatment. The numbers became clearly legible and disclosed that the boiler had been inspected in three different years, that it carried a National Board serial number and also an American Society of Mechanical Engineers number. This information satisfied the inspection and insurance authorities and a license was granted.

Automatic Oilers Cut Costs

Three solenoid-operated automatic oilers on a 100-inch boring mill at Nordberg Mfg. Co., Milwaukee, reduced the machine's annual lubricating cost 74 per cent, with a 50 per cent saving in the amount of oil used, and 90 per cent reduction in operation and maintenance of oilers. Annual lubricating cost of the machine was reduced from $281.00 to $75.00.

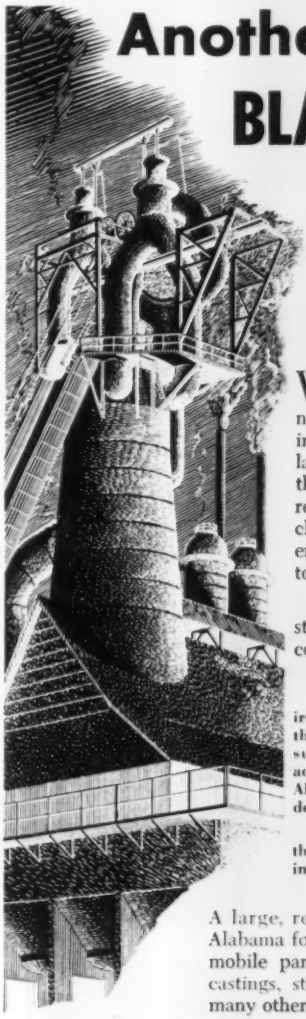
Previously, each of the 30 points on the boring mill had its own oiling cup that had to be filled daily by the machine operator who had to shut down the machine and fill and turn on each cup individually. Over-oiling, uncontrolled flow of oil and failure to shut off oilers at night created a loss of more than 31 gallons of lubricating oil per year. Spillage of oil over machine and surrounding floor endangered personnel and machine safety by creating a fire and slippery floor hazard. Another disadvantage of the cups was that they had a tendency to lubricate excessively at the start and gradually starve bearings during remainder of the operating cycles.

Installation of the automatic oilers reduced the number of oil reservoirs to maintain and operate from 30 to three. All 30 points on the boring mill are fed from the three centrally located and easy-to-see reservoirs that feed oil by gravity to 14, 8 and 8 outlets respectively. Easily adjustable outlets regulate the flow of oil as desired for each point to be lubricated. Not a single bearing has had to be replaced since the electro oilers were installed.

Solenoids of the oilers are connected across the line of the driving motor so that their operation is started and stopped automatically when the motor is started or stopped. Machine can be lubricated while running. Reservoirs are filled by a night oiling crew.

Transparent reservoirs are made for use at temperatures above 160° F and are large enough to hold a week's supply of oil per filling.

Made by the Oil-Rite Corp., Milwaukee, electro oilers are engineered for any number of outlets that can



Another Merchant BLAST FURNACE

Will Soon Light Birmingham's Night Skies

Woodward Iron Company—one of the nation's biggest independent merchant iron producers—now has in progress the largest capital improvement program in the company's long history. Woodward's record-breaking expansion program includes construction of a new and modern blast furnace. Operation is expected to begin in the Fall of 1951.

Announcing the company's new construction program, President B. C. Colcord said:

"Prior to 1900, the bulk of merchant iron produced in Alabama was sold north of the Ohio River. Today over 95% is consumed by Southern foundries. We need additional capacity at our plant because of Alabama's rapidly accelerating industrial development.

"In the next year or two we are confident that many more plants using grey iron castings will come to Alabama."

A large, ready, nearby market now exists in Alabama for such finished iron products as automobile parts, bathtubs, boilers, pillow blocks, castings, stoves, electric equipment, gears and many others.

The Committee of 100 or any of the undersigned members of the Executive Committee will welcome the opportunity to give you confidential and specific data regarding the advantages of the Birmingham district for your plant, office or warehouse.

BIRMINGHAM COMMITTEE OF 100

1914 Sixth Ave., N., Birmingham, Ala.

Executive Committee

Gordon Persons
Governor
State of Alabama

Bradford C. Colcord
President
Woodward Iron Co

John S. Coleman
President
Birmingham Trust
National Bank

Donald Comer
Chairman of the Board
Avondale Mills

William P. Engel
President
Engel Companies

W. W. French, Jr.
President
Moore Handley
Hardware Co

Clarence B. Hanson, Jr.
Publisher
The Birmingham News

W. H. Hoover
President
Employers Insurance
Co. of Alabama

Mervyn H. Sterne
Sterne, Agee & Leach

Claude S. Lawson
President
Sloss Sheffield
Steel & Iron Co

Thomas W. Martin
Chairman of the Board
Alabama Power Co

J. C. Persons
President
First National Bank

O. W. Schanbacher
President
Lewman, Joseph &
Loeb

A. V. Wiebel
President
Tennessee Coal,
Iron & Railroad Co.

NEW SHELL INDUSTRIAL

bring greater under extreme

FOR GEARS...

SHELL MACOMA OILS

FOR ENCLOSED GEARS, Shell Macoma Oils solve the problem of extreme pressure lubrication with *seven distinct advantages:*

1. Extreme load carrying capacity . . . remarkable ability to prevent wear and seizure . . . even after long periods under heavy load.

2. Long-lasting oxidation stability . . . plus freedom from sludge formation in the presence of water.

3. Outstanding adhesion . . . maximum protection against rust, and against leakage through worn bearings and seals.

4. Non-corrosive . . . will not cause corrosion of steel or alloy bearings.

5. Non-Foaming . . . Shell Macoma Oils successfully overcome the tendency to foam caused by aeration of oil in the gear chamber.

6. Speedy water separation.

7. Complete stability in storage and in service . . . no tendency to separate, even in extremes of heat and cold.

SHELL

Be sure to get all the facts about these new Shell Macoma Oils. Check the coupon and attach to your letterhead for full information.

Two great new products of

EP LUBRICANTS

safety to gears and bearings
loads and adverse conditions

FOR BEARINGS...

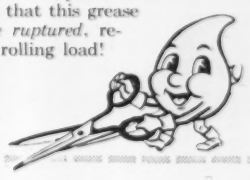
SHELL ALVANIA EP GREASE

FOR GREASE-LUBRICATED bearings, Shell Alvania Grease . . . the one grease that serves *all* grease applications in the majority of plants . . . *now is available with EP qualities added! . . . now even more Multi-Purpose.*

All of these unique advantages of Alvania Grease are therefore available for the first time to operators of machines subject to extreme bearing pressures:

1. **Higher mechanical stability** than any conventional grease at operating temperatures.
2. **Pumpable at low temperatures . . .** even through centralized lubrication systems.
3. **Stable at high temperatures . . .** no phase changes—still a grease at high temperatures—still a grease upon cooling.
4. **Resistant to water . . .** won't wash out.
5. **Longer service life . . .** reduced consumption.

Shell Alvania EP Grease is the answer to some of the toughest lubricating problems in industry. In rolling operations, for example, operators of steel, rubber, plastic and paper mills report that this grease film *just won't be ruptured*, regardless of shock rolling load!



Check the coupon and mail today for additional information about Shell Alvania EP Grease.

Shell Oil Company
50 West 50th Street, New York 20, N. Y.;
or 100 Bush Street, San Francisco 6, Cal.
Please send available data on
☐ Shell Macoma Oils ☐ Shell Alvania EP Grease

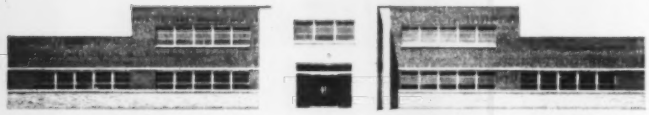
Name_____

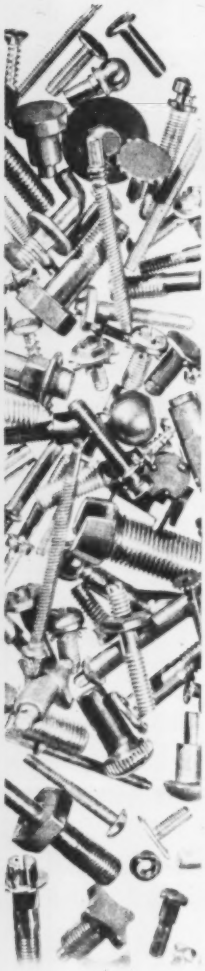
Company_____

Title_____

Address_____

SHELL OIL COMPANY





Consider Supply First!

ORDER

CAMCAR

SPECIALS • SEMS

THREAD CUTTERS • AIRCRAFT

PHILLIPS HEAD SCREWS

In All Cold-Heading Materials

We know what it means when you say, "*Our Line Is Down.*"

That's why we specialize in serving production users of *Fasteners* and *Special Parts.*

That's why our technical men are trained to *know your part* all the way through each manufacturing step.

That's why we can assign special machines to your particular problem . . . to give you the parts and fasteners when you need them.

Camcar believes in *supply* first — because screws, fasteners and special parts serve no good purpose until they have been assembled into your products.

When you need Fasteners or Special Parts . . .

Telephone 5-9451 or Teletype RK-53

CAMCAR SCREW & MFG. CORP.

605 EIGHTEENTH AVENUE, ROCKFORD, ILLINOIS

be increased or decreased in the future, and with reservoir sizes ranging up to a gallon capacity.

Less Gear Shifting

Development of a three-stage hydraulic torque converter transmission which eliminates 99 per cent of forward gear shifting on the toughest grades and which, combined with engine drag, can perform 90 per cent of the braking, is announced by Twin Disc Clutch Co., Racine, Wis. Successfully field tested under grueling hauling requirements on the Mesabi iron range, the new unit is known as the Twin Disc model DF direct drive hydraulic torque converter.

The converter, used with a closely-spaced transmission, provides efficient use of power for the trucks which haul loads up to 30 tons on grades up to 13 per cent. Hauling cycles have been significantly reduced, with substantial savings on axles, tires, gears and brakes.

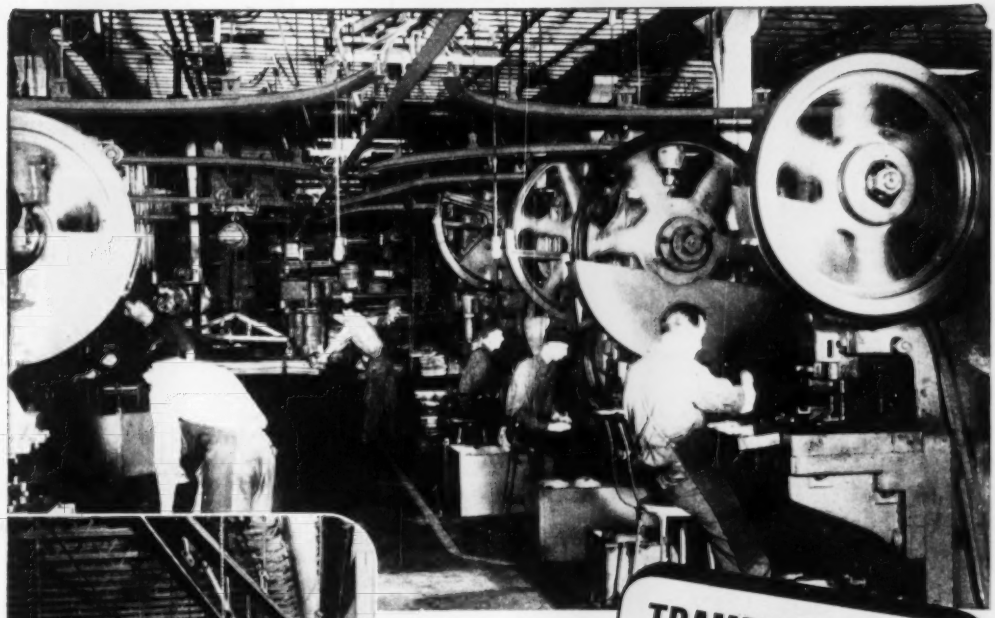
The five-speed transmission provides a reverse gear, a power take-off for the dump body and a low gear ratio for an unusually bad hole. Fourth speed of the transmission is a direct drive and it is in this ratio that the three-stage torque converter has done 99 per cent of its payload upgrade hauling on the Mesabi range.

Operator's control valve is equipped with four selections. (1) Neutral, (2) torque converter drive, (3) mechanical drive, and (4) combined engine and hydraulic braking. The converter is a compound unit made up of three major assembly groups: (a) Oil-actuated clutch group, (b) basic torque converter and (c) freewheel assembly.

Pressure Oiler Aids Routing

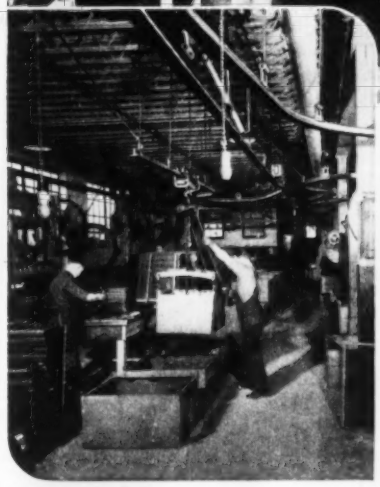
A pressure oiler attachment for tilt table routers developed by an employee in the material preparation department of Texas Engineering & Mfg. Co. Inc., Dallas, has reduced man-hours in routing operations by approximately 12½ per cent, and at the same time added more than double cutter life before replacement is required. Other advantages resulting from the use of the device include cleaner cuts on the routed parts and a consequent reduction in the burring time required.

Development consists of a one quart oil container, rigidly mounted, which is connected to the router head with a piece of flexible tubing. The container is equipped with an oil adjustment valve. Pressure is supplied by a compressed air line which attaches to an air pressure regulator valve and an automatic cutoff valve which are mounted to the oil con-



This illustrates the extreme flexibility of Cleveland Tramrail. This rail system is so laid out that hand-operated hoist carriers can deliver materials from any press to any other press without intermediate handling.

Courtesy United States Register Co., Battle Creek, Mich.



Boxes of materials are easily picked up and transported. If desired, this type of Cleveland Tramrail system can be electrified and the heavy lifting done with motor-driven hoists.

TRAMRAIL SERVES EVERY PRESS at United States Register Company

75% REDUCTION IN TIME FOR DIE CHANGES — NO HANDLING ACCIDENTS SINCE INSTALLED IN 1938 . . .

An inexpensive, easily-installed, hand-propelled Cleveland Tramrail system interconnects all presses with each other and also connects each with the die storage and machine shop. All but 18 small presses are served this way.

Hand and motor driven hoists are used in making die changes and servicing the presses with raw stock. Dies up to one ton are handled without difficulty and with 75% reduction in time over hoists formerly used.

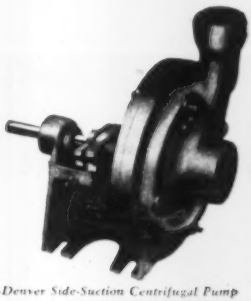
No accidents in the handling of dies and materials have occurred since this system was installed in 1938.

GET THIS BOOK!
BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
7849 East 284th Street, Wickliffe, Ohio

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

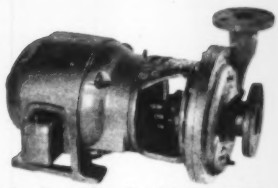
It's easy to get the right pump!



Gardner-Denver Side-Suction Centrifugal Pump

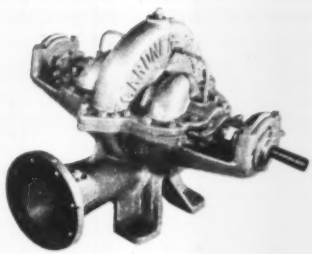
Call your Gardner-Denver field engineer. He'll gladly work with you in planning the most economical and efficient pumping layout. And he's an expert at specifying the *correct* pump for every installation.

He may recommend the compact Gardner-Denver Close-Coupled Centrifugal, which may be installed in many positions—or the easy-to-hook-up Gardner-Denver Side-Suction Centrifugal—or the heavy-duty Gardner-Denver Double-Suction Centrifugal. All Gardner-Denver pumps are built in a wide range of capacities—can be furnished in corrosion or abrasion resisting materials when required.



Gardner-Denver Close-Coupled Centrifugal Pump

Write us today for complete information. Ask for the name and address of the Gardner-Denver pumping engineer nearest your plant.



Gardner-Denver Double-Suction Centrifugal Pump

SINCE 1859

GARDNER-DENVER

THE QUALITY LEADER IN PUMPS, COMPRESSORS AND ROCK DRILLS

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada) Ltd., Toronto, Ontario

tainer with rigid tubing. Total cost, including materials and labor, to equip a router with the new device is under $35. Prior to the adoption of employee's development, standard practice was to apply cutting oil with a brush to the work being routed rather than to the cutter.

Water Hammer Research Aired

Cause, effect and control of water hammer in piping systems are considered in a new 8-page bulletin published by Williams Gauge Co., Pittsburgh.

After describing water hammer in nontechnical terms, the brochure indicates its potential damage to piping, instruments and other parts of water systems, and then considers the various methods of controlling it.

A phase of hydraulics about which little is known, water hammer was studied in detail in several hundred tests. Among other things, intensity, action of the pressure wave and origin of water hammer were studied. Shown in this new brochure are a number of curves representative of some of these tests. They indicate pressures up to 304 pounds developed in 1/10 of a second, and illustrate the bellows-like expansion and contraction of a pipe subjected to water hammer.

Also included are results of further tests made to determine what effects check valves have in overcoming water hammer. Both tests on conventional swing check valves and the newer type silent check valve are reported.

The findings reported in this booklet for water hammer are believed equally true of cold water, hot water, condensate, whitewater, boiler feed water, beer, crude oil, gasoline, hot caustic soda solution, acids, paper stock, etc.

Copies may be obtained from the company, 1620 Pennsylvania Ave., Pittsburgh 33.

Brass Qualities Defined

The word brass as it is commonly used covers a very wide range of several hundred copper base alloys, each of which has differences and particular advantages such as cost, strength, machinability, corrosion resistance or some other quality. To help the metalworking industry distinguish between copper base alloys, Bridgeport Brass Co. is making available a four-page folder which lists 65 commonly used brass and copper alloys, along with their composition, properties, forms and typical uses.

This folder should prove useful to anyone concerned with designing, es-

The ABC of MST

A ALWAYS MAKES POSSIBLE
B ETTER PRODUCTS
C AT LOWER COST

Michigan
Electric Resistance
WELDED
STEEL TUBING

A Quality Product

ROUND
⅜" to 4" O. D. 9 to 22 gauge
SQUARE-RECTANGULAR
½" to 2" 20 gauge, 1" to 2¾", 14, 16, 18 gauge
Carbon 1010 to 1025

Michigan Tubing has uniform strength, weight, ductility, I. D. and O. D., wall thickness, machinability, and weldability. It can be flanged, expanded, tapered, swaged, beaded, upset, flattened, forged, spun closed, fluted, and rolled. Available in a wide range of sizes, shapes and wall thicknesses, prefabricated by Michigan or formed and machined in your own plant.

Consult us for engineering and technical help in the selection of tubing best suited to your needs.

We Did It Before...

We rolled up our sleeves before and the whole world was amazed at the miracle of American production. Now we're at it again and Michigan is proud to be doing its share in this great defense effort.

Michigan electric resistance welded steel tubing found its way into numerous products for the armed forces during World War II, such as automobiles, trucks, incendiary bombs, and airplanes. Another use was invasion line tubing. Design simplification and adaptability, qualities making for economical and faster production, were among the reasons why so many manufacturers turned to Michigan tubing.

As we "do it again" during the present defense emergency, consider how Michigan tubing can be applied to your product. We'll appreciate the opportunity of discussing its use, whether for defense or consumer items.

THE OLDEST NAME IN ELECTRIC RESISTANCE WELDED STEEL TUBING
Michigan STEEL TUBE PRODUCTS CO.

More Than 30 Years in the Business
9450 BUFFALO STREET • DETROIT 12, MICHIGAN
FACTORIES: DETROIT, MICHIGAN • SHELBY, OHIO

DISTRIBUTORS: Steel Sales Corp., Detroit, Chicago, St. Louis, Milwaukee, Indianapolis and Minneapolis—Miller Steel Co., Inc., Hillside, N. J.—C. L. Hyland, Dayton, Ohio—Dirks & Company, Portland, Oregon—James J. Shannon, Milton, Mass.—Service Steel Co., Los Angeles, Calif.—American Tubular & Steel Products Co., Pittsburgh, Pa.—Strong, Carlisle & Hammond Co., Cleveland, Ohio—Globe Supply Co., Denver, Colorado—W. A. McMichaels Co., Upper Darby, Pa.—A. J. Fitzgibbons Co., Buffalo, N. Y.

timating or purchasing in industries which use copper base alloys. Copies of this folder may be obtained by writing to Sales Promotion Service, Bridgeport Brass Co., 30 Grand St., Bridgeport 2, Conn.

Standards Medal to Dr. Agnew

In recognition of a lifetime of service and leadership in the cause of standardization, the first award of an annual gold Standards Medal has been made to Dr. Paul G. Agnew, consultant to the American Standards Association and an outstanding authority on standards in the United States. Formal presentation of the medal, which will be given each year by the association, will be made at the standardization conference in New York, Oct. 22-24. Dr. Agnew has spent 45 years in standards work. He served as first administrative head of the association from the time it was founded in 1919 until his retirement to consultant status in 1947.

During his 28 years in office, the organization's staff grew from three to 70 persons, and its membership rose from five engineering societies to a federation of some 100 national trade associations, technical societies and consumer organizations. Today there are 1215 American Standards in use in such fields as engineering, safety, industrial and consumer goods.

His testimony before the hearings of the Temporary National Economic Committee on trade barriers in 1940 was an important milestone in bringing standardization to the attention of government and industry officials as a major factor in eliminating restraint of trade. He has been active in international standards work, participating in meetings which led to the founding of the International Organization for Standardization in 1946 and helping to draft its constitution at meetings in Paris and London in that year.

Stresses Powder Metallurgy Use

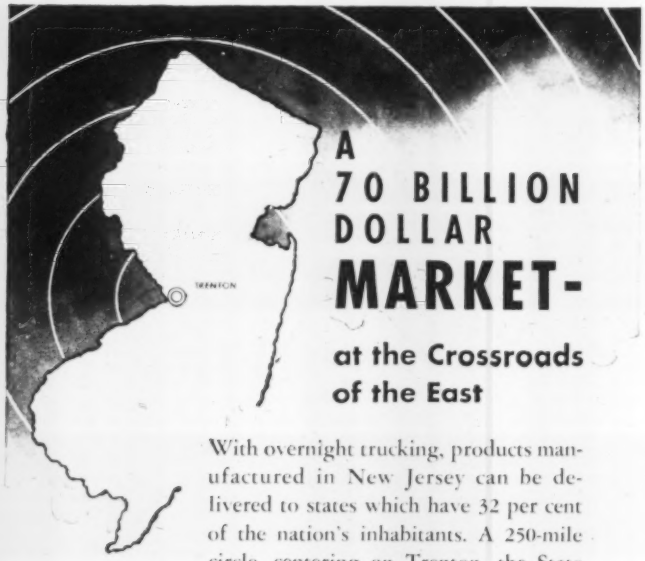
Applications of powder metallurgy in bearings and structural parts are the keynote of "Bound Brook Bulletin," the first issue of which was recently published. Featured is a summary of new developments in Army tank production and of the place of powder metallurgy in the ordnance procurement program. Another article deals with the economies made possible by powder metallurgy in the manufacture of shell parts.

Copies of the first issue of this new 4-page, $8\frac{1}{2}$ x 11-inch house magazine have been distributed to an extensive list of companies and individuals interested in applications of powder metallurgy. There is no charge for subscriptions, and requests for addition to the mailing list should be addressed on company letterhead to Mr. S. S. Connor, Bound Brook Oil-Less Bearing Co., Bound Brook, N. J.

Roller Bearing Line Expanded

Trend toward equipping all types of railroad cars with roller bearing journal boxes is given added impetus by the announcement by H. K. Porter, general sales manager, Hyatt Bearings Division of General Motors, Harrison, N. J., of the introduction of a line of roller bearing journal boxes for freight cars. This equipment has been standard equipment on railroad passenger cars and diesel locomotives for many years. Today, few modern passenger trains operate on plain bearings because train speeds and passenger comfort standards require roller bearing equipment.

Railroads have moved slowly in equipping freight cars with roller bearings because of the higher initial investment required and the problems presented by freight car interchange between railroads. Stepped up freight



A 70 BILLION DOLLAR MARKET-

at the Crossroads of the East

With overnight trucking, products manufactured in New Jersey can be delivered to states which have 32 per cent of the nation's inhabitants. A 250-mile circle, centering on Trenton, the State capital, will encompass or intersect 12 states and the District of Columbia. This area is populated by approximately 14,000,000 families.

From a market analysis standpoint it is important to note that these people represent more than 70 billion dollars of effective buying income after the deduction of federal income taxes. It is the highest income market in the nation with an estimated income average of $5,134 per family.

Write for your copy of the new digest about New Jersey, "An Industrialist's View of the Crossroads of the East." Box B, Public Service, 76 Park Place, Newark N. J.

PUBLIC SERVICE
ELECTRIC AND GAS COMPANY
NEWARK, N. J.

NEW JERSEY CROSSROADS of the EAST

"Mighty mite"—

David reduced Goliath by using accumulated power. Today, engineers use Greer Accumulators to reduce the size, complexity, and cost of machine tools, metal processing equipment, and hundreds of other power-driven machines. A Greer Accumulator, weighing only a few pounds, can transform the energy of a small motor into a tremendously increased intermittent hydraulic thrust, and deliver it instantly when needed. May we show you what a Greer Accumulator can do for you?

GREER ACCUMULATOR performs giant tasks in hydraulic circuits

Besides magnifying power, Greer Accumulators perform many other functions which improve the operation of hydraulic circuits:

- ★ *Compensate for fluid leakage*
- ★ *Dampen pulsation shocks*
- ★ *Operate secondary circuits*
- ★ *Supply emergency fluid power*
- ★ *Maintain pressure lubrication*

New Greer Bulletin 301 is packed with ideas, details, and circuits showing different applications of Greer Accumulators. Send for your copy.

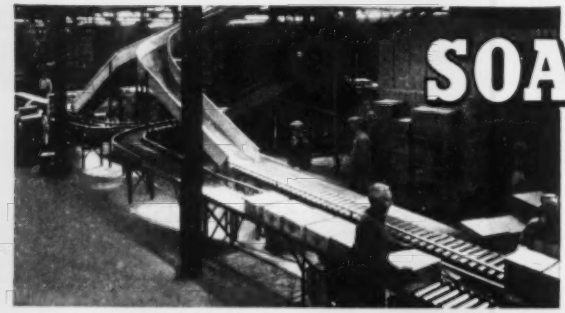
GREER
ACCUMULATORS

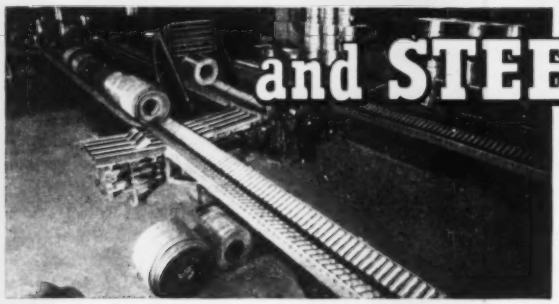
U. S. PATENTS UNDER OLEAR LICENSES

GREER HYDRAULICS INC.
450 18th STREET
BROOKLYN 15, N. Y.

Sales Representatives in All Principal Cities
District Office: 407 South Dearborn Street, Chicago 5

Manufacturers of
HYDRAULIC ACCUMULATORS
HIGH PRESSURE HYDRAULIC COMPONENTS
AIRCRAFT TEST EQUIPMENT





Whatever you make or handle, Standard Conveyors speed operations . . . save time and costs . . .

Cartons of soap — bags of potatoes — coils of sheet steel, weighing several tons — Standard Conveyors are built to handle them all — smoothly — at lowest cost.

Whatever you make or handle in your business Standard Conveyor, with an experience record of more than 45 years, has the "know-how" to assist you to use conveying equipment to best advantage. Write —

Write to Dept. St-101 for valuable reference book "Conveyors by Standard" and tell us what you want to convey.

STANDARD CONVEYOR COMPANY
General Offices: North St. Paul, Minnesota
Sales and Service in Principal Cities

ROLLER • BELT • SLAT • CHAIN • WHEEL
PUSH-BAR • SECTIONAL
PORTABLE CONVEYOR UNITS:
HANDIBELT • HANDIPILER
INCLINEBELT • LEVEL BELT • EXTENDOVEYOR
UTILITY BELT-VEYOR • HANDI-DRIVE
VERTICAL LIFTS • PNEUMATIC TUBE SYSTEMS

schedules and demands for freight traffic at passenger train speeds for fuller utilization of rolling stock investment has produced greater interest in roller bearing journal boxes for freight cars.

Hyatt produces a large share of the roller bearing journal boxes presently used on diesel locomotives and passenger cars and has drawn on this experience to produce a new line of freight car journal boxes. These boxes are designed to fit conventional freight car trucks with both the integral box type and pedestal type side frames.

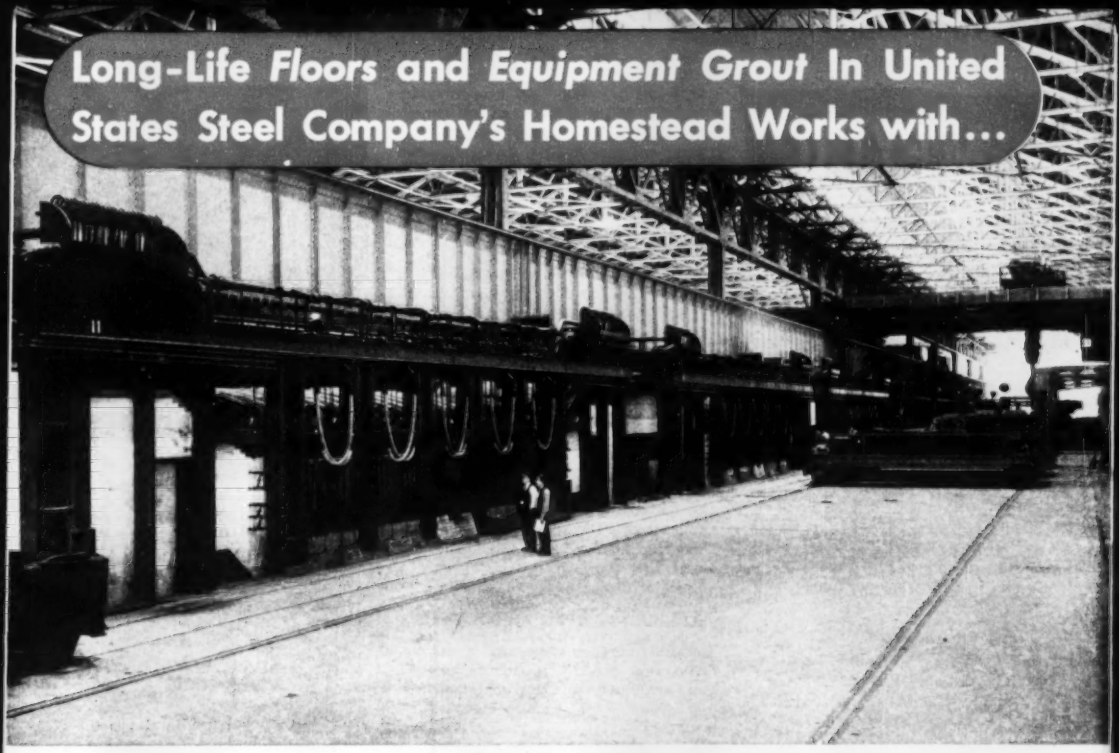
These journal boxes can be installed to replace existing plain bearing equipment with a minimum of alteration to the freight car truck side frames.

Journal boxes are grease lubricated and bearings are of the straight radial

Tool Machining Time Slashed

DRILLING and boring the exacting positioning holes in tools for tail cones on the General Electric J-47 jet engine is a job on which Ryan Aeronautical Corp., San Diego, Calif., is saving valuable man-hours. Formerly drill points were located by hand using temporary drill templates and a calibrated scale because of the large size of tooling. The job took 40 hours. Now this horizontal boring, drilling and milling machine built by Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., performs the same job in 8 hours with holes being located and drilled using the precision scales of the machine itself. Ryan reports the machine, designed with an unusually large bed and open-type structure, is being used efficiently on single pieces, short runs and quantity production

Long-Life *Floors* and *Equipment Grout* In United States Steel Company's Homestead Works with...



UNITED STATES STEEL COMPANY, HOMESTEAD, PENNSYLVANIA

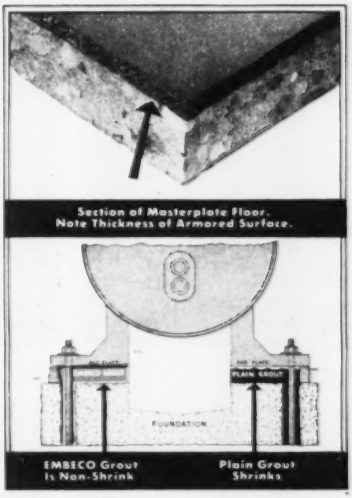
MASTERPLATE IRON-CLAD CONCRETE FLOORS
EMBECO **Non-Shrink** GROUT

The best evidence of the good performance and long-term economy obtained with Masterplate and Embeco is their repeated use in such leading plants as United States Steel Company's Homestead Works.

MASTERPLATE . . . produces an iron-armored surface about one-eighth inch thick on concrete floors — at time floor is installed. A Masterplate Floor wears 4-6 times longer than the best plain concrete floor . . . is spark resistant, static disseminating, non-dusting, corrosion resistant, easy-to-clean, non-slip, economical. Non-colored and eleven colors.

EMBECO . . . counteracts mortar shrinkage — principal cause of failure in equipment grouts. Produces easy placeability, early strength to avoid long, costly shut-downs. Provides complete, level bed-plate contact, plus ductility to withstand impact, vibration and pounding action.

Full information on Masterplate and Embeco and "see-for-yourself" demonstration kits supplied on request . . . without cost or obligation.

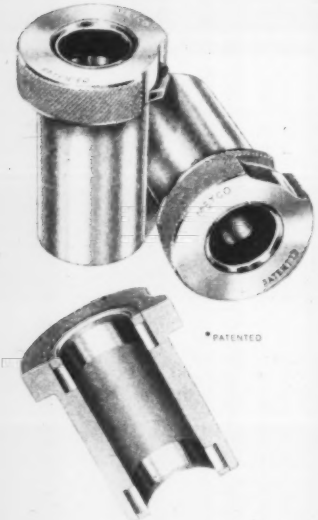


the MASTER BUILDERS ltd

CLEVELAND 3, OHIO — Subsidiary of American-Marietta Company — TORONTO, ONTARIO

MEYCO

CARBIDE INSERTED DRILL JIG BUSHINGS



*PATENTED

☆ Combining the best features of steel and carbide—here is the answer to increased production and to tough drilling problems: MEYCO Carbide Inserted Drill Jig Bushings.

MEYCO bushings last as long as solid carbide bushings in most cases and cost a great deal less—they will increase the life of drill jigs, fixtures, drills and reamers—they will maintain accuracy for a much longer period of time—they will increase production, save you money in machine-down time, lost man-hours and less spoilage.

MEYCO bushings are made to A.S.A. Standards in Headless Press Fit, Head Press Fit and Fixed Renewable Types. MEYCO Bushings can also be adapted to many special applications—write for fully informative catalog No. 52 today.

Manufacturers of precision tools since 1888

W. F. MEYERS CO., INC.
BEDFORD, INDIANA

type giving maximum load-carrying capacity in the space provided. Thrust loads are taken against liberally proportioned race flanges. Straight radial construction of the bearings permit car axles to float laterally within predetermined limits thus cushioning sidewise shocks and reducing wheel flange wear.

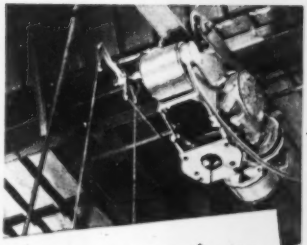
All bearing and box parts are accessible for cleaning and inspection. Both journal boxes and bearings can be removed from car axles without breaking race fits. Spare wheel and axle sets can be stored with only inner races, spacer and thrust rings in place instead of complete journal boxes thus reducing spare parts inventories. Housings for integral box type side frames are designed in such a way that they can be reversed top to bottom to present a new wear surface in the bearing load zone thus lengthening the usable life of the unit.

Recondition Centrifuge Baskets

Smoother production operations and more positive production control are the results of a new method of reconditioning paint-clogged centrifuge baskets at Eastman Kodak Co., Rochester, N. Y. Film spools are bathed in lacquer by the basket load and then spun to remove the excess liquid. The baskets become coated on the inside and outside with successive layers of dried lacquer which chips and lodges on the spools. In order to recondition the baskets for further use, Eastman cleans them by airless abrasive blasting in a swing table manufactured by American Wheelabrator & Equipment Corp., Mishawaka, Ind.

Machine has a 24-inch diameter work table on which the baskets are placed. Loading and unloading is easy because the table is mounted on the door of the cabinet, and when the door is opened, the table swings out into the room. During the cleaning operation, the table with the basket on it rotates under a blast of metallic abrasive thrown from an airless rotating wheel. Power requirements are slight; a 10 hp motor runs the abrasive hurling wheel.

Film spools for roll film are assembled after the proper stamp has been placed on the component parts, and they are put into centrifuge baskets made of 12 gage perforated sheet steel. These baskets are 13 inches high, have a 12-inch diameter at the bottom and a 17¼ inch diameter at the top. The baskets are conveyed through a vapor degreaser and then to the painting process whereupon they are placed in the centrifuge. Japan fluid is poured over them, and



Modern Hoist Logic:
3-2 = LOWER COSTS!

—Yes, rock-bottom handling costs—*and* more output per hour! Here's the record: Heavy drums of chemicals had to be lifted to a raised vat—and lifted fast. The block and tackle formerly used required 3 men to get the proper lift speed. This ½-ton Reading Electric Hoist paid for itself in 2 months by keeping 2 men on their regular jobs and letting the third raise drums alone—in half the previous time! Let a Reading engineer help you get the same kind of handling results with a fast, smooth-working Reading Electric Hoist. Drop us a line today for full details. No obligation, of course.

READING CRANE & HOIST CORP.
2102 ADAMS STREET • READING, PA.

READING HOISTS

the machine is completely closed. The baskets are then spun for about 90 seconds to drive off excess fluid, whereupon they are taken to the drying ovens and left there for 1 hour and 40 minutes. Following this, the reels are given a second coat of japan lacquer, centrifuged and dried.

When the final drying is complete, finished reels are taken from the baskets. All baskets are inspected at this point, and those that are heavily coated are taken to the blasting table for cleaning, while others are sent back for another load of reels. It usually takes about 10 to 12 passes through the lacquering process and the drying oven before a basket needs cleaning. When put in the table at the rate of $10\frac{1}{2}$ per hour, they are blasted for $2\frac{1}{2}$ minutes in the upright position and 1 minute in an inverted position. The remaining time is spent in loading, unloading and turning the baskets over.

Install Supercharged Generator

Installation of the world's first supercharged generator at the Edgewater plant of Wisconsin Power & Light Co. in Sheboygan, Wis., is announced by Allis-Chalmers Mfg. Co., Milwaukee. Rated at 60,000-kw, 12,500-v, this 3600-rpm steam turbine driven generator was installed in midsummer and is now in operation. It embodies a new principle which saves 30 to 40 per cent of the material of a normal 60,000-kw machine.

Great reduction in weight and length is achieved by forcing hydrogen at much higher velocity than has been used before, directly over the surfaces of the current-carrying copper conductors of the rotor. In addition to the normal fans for circulating the hydrogen, the new generator has a two-stage centrifugal compressor, much like an oversize aircraft supercharger, mounted at one end of the rotor shaft supplying gas to the rotor. To get the heat out of the rotor faster, engineers have devised specially shaped copper windings through which cool hydrogen travels at high speed. After being heated in passing through the rotor, hydrogen is cooled by conventional water-to-hydrogen heat exchangers.

Heat removing ability of the supercharged design is demonstrated by test data showing that in less than one-fiftieth of a second hydrogen passes through the full length of the rotor passages of a 60,000-kw machine, while at the same time it absorbs enough heat to raise the temperature to 90°F.

In addition to the great savings in copper and steel effected by the new design, several other very important

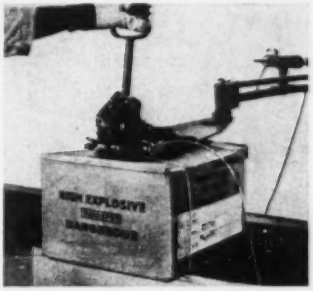
Get the most out of your strapping . . .

TIE DEFENSE ORDERS WITH GERRARD ROUND STEEL STRAPPING

GERRARD ROUND STRAPPING complies fully with the joint Army-Navy specifications JAN-P-106A, JAN-P-107, and JAN-P-108 for overseas packing. That means it is strong enough to do a good job.

It has other advantages besides strength, however. Because it is round, it is ideal for palletizing either regular or odd-shaped units, and it can be applied as a Diagonal Tie to give secure reinforcement to all six sides of a box or carton.

Why not consult a Gerrard engineer about your defense strapping problems? He may be able to suggest a method of strapping that will help get more use out of your available strapping. Strapping ordered for defense receives preferences in delivery according to current regulations. Strapping available for non-defense orders is being equitably distributed among our customers.



Two 16 ga. round steel straps close and reinforce this carton of powder. This method of closure permits cartons to be reused many times. Gerrard Model TI machine is mounted on suspension arm.

Gerrard Steel Strapping Company
4745 South Richmond St., Chicago 32, Ill.

GERRARD ROUND STEEL STRAPPING

UNITED STATES STEEL

Handiest Location in PITTSBURGH

Hotel Pittsburgher
PITTSBURGH, PA.

Right in the heart of town

Make the PITTSBURGHER your stopping place on every motor trip. Located right in the heart of town . . . easily reached from all major highways. Enjoy the finest in modern facilities, too . . . 400 rooms each with free radio, bath and circulating ice water. Garage service.

a Knott Hotel

JOSEPH F. DUDDY, MANAGER

Butadiene and styrene tank farm

This SPECIAL HAZARD fire protection safeguards chemical processing operations

Most manufacturing plants and many industrial and commercial business operations present certain areas of extreme fire hazard that are not adequately safeguarded through standard methods of fire protection. The chemical processing and storage operation shown is one such case. At this location, *Automatic* **FIRE-FOG** systems of protection detect and dissipate concentrations of vapors above the lower explosive limit. This type of protection assures the maximum in personnel and fire safety, preservation of high-valued equipment and continuity of plant operations.

Like all SPECIAL HAZARD systems, *Automatic* **FIRE-FOG** is specifically engineered for the risk that is protected. Many other installations of similar nature have been made in chemical processing properties throughout the world. And, like any other worth-while product, **FIRE-FOG** stands on its records of achievement . . . records that are written into the reports of all leading insurance bureaus.

Regardless of your SPECIAL HAZARD requirements, you'll find that our preliminary engineering service makes possible a fair economic and adaptability evaluation of all fire protection methods for your own risk. This engineering service plus the facilities of our laboratory and test yard is available to you without cost or obligation.

If yours is a special condition—we either have the fire safety answer, or will use our entire facilities to find the answer. Write or call us today

"AUTOMATIC" SPRINKLER CORPORATION OF AMERICA
YOUNGSTOWN 1, OHIO

Automatic Sprinkler

FIRST IN FIRE PROTECTION

OFFICES IN PRINCIPAL CITIES OF NORTH AND SOUTH AMERICA

advantages are brought about. Powerhouses of the future will be smaller and less costly, resulting from the shorter rotor and reduced rotor removal space required. Foundations will be simpler and reduced in size. Short circuit currents are substantially reduced, with consequent savings in cost of circuit breakers, reactors and other equipment and with less damage likely to occur in event of short circuit.

According to the company's engineers, the change from air to hydrogen cooling first introduced about 16 years ago and now universally used on machines of this type accomplished a 20 to 30 per cent boost in ratings for an equivalent frame size. By comparison, supercharged cooling in one step has raised generator ratings a further 70 per cent without any increase in amount of active material required.

Build Huge Transformers

Westinghouse Electric Corp. announced plans today to build the world's three most powerful transformers and two others which will rank among the largest in physical size.

The five power giants together will supply sufficient power to light 14 million 60-watt light bulbs—enough to string at two-foot intervals for more than 5300 miles.

From the standpoint of power they are 190,000 kilovolt-ampere units ordered by the Detroit Edison Co. to be installed in Detroit Edison's new St. Claire station. Each transformer will handle 250,000 horsepower of electrical energy and will be built to operate at 138,000 volts. Westinghouse in 1949 shipped to Detroit Edison the then world's most powerful transformer—a 145,000 kilovolt-ampere unit.

The two giants from the standpoint of physical size soon to go into production are 150,000 kilovolt-ampere transformers destined for Central Illinois Public Service Co. Because these will handle higher voltages—230,000 volts—and use air instead of water as the cooling medium, they must of necessity be physically larger than the more powerful 190,000 kilovolt-ampere Detroit Edison transformers, explained Frank L. Snyder, manager Westinghouse's transformer division.

Each of the Central Illinois Public Service giants will be as large as a six-room house (31 feet square and 28 feet high) and weigh approximately 250 tons. For each transformer, forced-air cooling from 30 electric fans and six oil circulating pumps will carry away the heat generated.

Each of the three Detroit Edison

Want a tubing that's a bear for punishment? Look into Bundyweld!

Bundyweld Tubing is double-walled from a single strip. Exclusive, patented beveled edge affords smoother joint, absence of bead, less chance for any leakage.

Here's the best-known small-diameter tubing of them all.

It's Bundyweld, preferred in industry and defense wherever tubing parts must ride rough herd through vibration, stress, shock or strain. The reason is simple . . . and exclusive. Bundyweld, the multiple-walled type of Bundy® tubing is double-rolled from a single strip with inside beveled edge. No other like it anywhere.

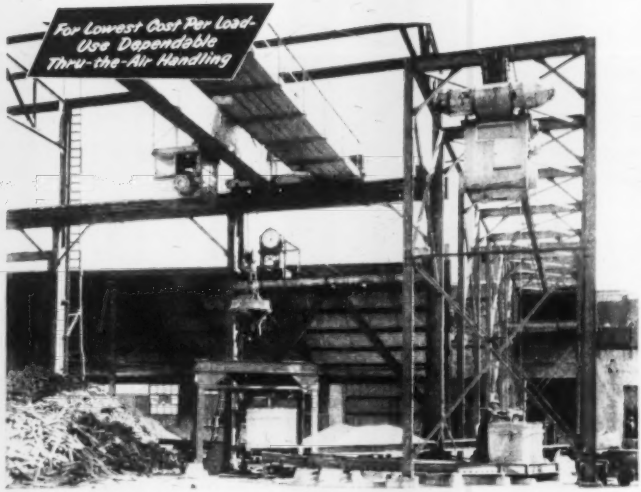
For information on availability, for help in design or fabrication of any tubing part, why not come to headquarters for small-diameter tubing today?

Bundy Tubing Company

DETROIT 14, MICHIGAN

World's largest producer of small-diameter tubing

AFFILIATED PLANTS IN ENGLAND, FRANCE AND GERMANY



Shepard Niles weather-proofed, double-monorail cupola charger, teams up with a 5-ton Shepard Niles weather-proofed, magnet-handling crane and Shepard Niles bottom-dump cupola buckets to speed operations and reduce handling costs at a large mid-western foundry. Notice that crane operator has unobstructed view of scale, assuring accurate control of proper amounts of pig and scrap iron.

we start by asking "what"

WHAT are *your* problems? Under WHAT conditions will *your* crane or monorail hoist be operated—intermittently, or under fairly constant conditions? WHAT are the operating speeds necessary to meet *your* productive cycle?

Answers to these and similar questions made it possible for Shepard Niles to provide efficient, dependable service, plus extremely low maintenance costs—giving this mid-western foundry the lowest handling cost per load for years to come.

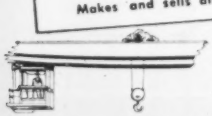
Be sure you get the equipment best qualified to do *your* job. It's wise—and costs you nothing—to get the facts first, rather than to make expensive changes later.

May we place our experience of a great many years of successfully designing all types of crane installations at your disposal?

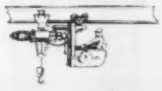
Shepard Niles

CRANE & HOIST CORPORATION

Makes and sells all three lifting tools for airborne shop loads



CRANES • Overhead



HOISTS • Cab Operated

HOISTS • Floor Operated

358 SCHUYLER AVE. • MONTOUR FALLS, N.Y.

transformers will be cooled by 500 gallons of water passing through four external heat exchangers every minute. Water running through copper pipes in the heat exchangers will serve to cool the oil which is circulated through the transformer and the heat exchangers by means of four oil circulating pumps.

Although smaller than the Central Illinois Public Service units, the Detroit Edison transformers will weigh 160 tons each and will stand 23 feet high.

Radio Directs Materials Flow

A fleet of radio-equipped plant vehicles, controlled from a central dispatcher, form the backbone of materials handling equipment at Timken Roller Bearing Co.'s Steel & Tube Division plant in Canton, O. Twenty-four mobile units, including locomotive cranes, a jeep, fork trucks and nine straddle-trucks are equipped with Motorola FM two-way radios in order to reduce movement time, eliminate dead-heading, improve control and increase operating efficiency.

Straddle-trucks haul steel billets from the mill to storage points in the yards around the plant and return them when needed to the mills for further processing or shipping. There are a number of outdoor storage yards at distances from a few hundred feet to half a mile from the mills.

Before the installation of two-way radio, one man was assigned the job of just chasing down plant vehicles and giving the drivers orders from the dispatcher. There was no other way to contact the vehicle operators. Radio was initially installed because some new means of communications was a necessity.

Dispatcher now has full authority to direct mobile equipment by use of the radio equipment. He controls operations based on requests for movements telephoned to him by production control people in different parts of the plant. In order to make sure the operations are carried out with maximum efficiency, a work recorder is installed on each radio-equipped vehicle.

New Welder Catalog Offered

A new, two-color catalog featuring the complete line of Shop King arc welders is issued by Precision Welder Mfg. Co., Chicago. It includes illustrations of each of the seven models plus a complete general and technical description of their construction, uses and output. For your copy write to the company at 660 W. Grand Ave., Chicago.

Tube Swelling Can't Happen Here

NO TUBE SWELLING... NO PRESSURE LOSS... WITH THIS SPECIAL STAINLESS STEEL INNER WIRE BRAID

Here's the special stainless steel inner wire braid that puts CONCORD #20 Steam Hose in a class by itself. The constant inside diameter assures full steam pressure at all times.

Concord #20
STEAM HOSE

Most steam hose fails for one main reason: tube swelling. But this failure will never shorten the life . . . *or lessen the dependability* . . . of patented CONCORD #20 Steam Hose.

For this hose is constructed with a special stainless steel inner wire braid that cannot swell.

This means that you will always have a full pressure flow because tube constriction can't occur.

Too, when re-coupling becomes necessary, you'll be able to do it easily, quickly, with no complications.

Other construction features of this great steam hose: alternate high tensile steel wire and rubber layers firmly bonded over the outside of the tube for maximum burst protection. Asbestos braid provides positive cover adhesion and acts as cover insulator. And the tough, abrasion-resistant cover withstands the most severe abuse.

CONCORD #20 . . . flexible, tough, dependable... is the steam hose you'll want to have working for *you!*

BWH
DEPENDABLE RUGGEDNESS

Another Quality Product of

BOSTON WOVEN HOSE & RUBBER COMPANY

Distributors in all Principal Cities

PLANT: CAMBRIDGE, MASS. • P. O. BOX 1071, BOSTON 3, MASS., U. S. A.

Three steps towards BETTER SERVICE of

UDDEHOLM STEELS

known for *Quality*, steadily improved since first made in Sweden 1668.

1 NEW YORK

Recently completed extension of our New York Warehouse enables us not only to offer a wider range of UDDEHOLM TOOL STEELS but we have also added a full range of UDDEHOLM SWEDISH STRIP STEEL in thicknesses from .001", manufactured at Uddeholm's renowned MUNKFORS mills in Sweden, including Annealed and Blue Tempered Spring Steel Bandsaw Steel Flapper Valve Steel Thickness Gauge Steel Textile Steel Razor Steel including Stainless AEB Reed Steel etc.

2 CLEVELAND

Uddeholm well-known TOOL STEELS, including Ground Stock and Drill Rods are again available in the Cleveland district from our newly established warehouse at 3756 Carnegie Avenue, Cleveland Phone: HEnderson 1-7440

3 LOS ANGELES

A branch office in this city with complete warehouse facilities for Tool Steel and Cold Rolled Specialties etc. now in process of construction to serve the West Coast Industries.

You are cordially invited to visit our booth B. 116 at the National Metal Exposition at Detroit October 15-19

UDDEHOLM COMPANY OF AMERICA INC.

155 East 44th Street, New York

CALENDAR
OF MEETINGS

October 15-19, National Association of Manufacturers: Annual institute on industrial relations, Lake Placid Club, Essex County, New York. Association address: 14 W. 49th St., New York 20. Institute director: Sibyl S. Patterson.

October 16-19, Scientific Apparatus Makers Association: Record controller & midyear meeting, Seaview Country Club, Absecon, N. J. Association address: 20 N. Wacker Drive, Chicago 6. President: Kenneth Anderson.

October 17-18, Steel Shipping Container Institute Inc.: Fall meeting, Pierre & Hampshire House, New York. Institute address: 570 Lexington Ave., New York 22. Secretary: L. B. Miller.

October 18-20, Anti-Friction Bearing Manufacturers Association: Fall meeting, The Homestead, Hot Springs, Va. Association address: 60 E. 42nd St., New York 17. Secretary-manager: H. O. Smith.

October 18-20, National Association of Corrosion Engineers: Annual meeting, south-central region, Corpus Christi, Tex. Association address: 919 Milam Bldg., Houston 2. Executive secretary: A. B. Campbell; meeting chairman: George A. Mills.

October 19-20, American Society of Tool Engineers: Semi-annual directors' meeting & south-central regional meeting, Vendome Hotel, Evansville, Ind. Society address: 10700 Puritan Ave., Detroit 21. Executive secretary: Harry E. Conrad.

October 22-24, American Mining Congress: 1951 metal and nonmetallic mineral mining convention, Biltmore Hotel, Los Angeles. Congress address: Ring Bldg., Wahington 6. Secretary: Julian D. Conover.

October 22-24, American Standards Association: Annual meeting & national standardization conference, Waldorf-Astoria Hotel, New York. Association address: 70 E. 45th St., New York. Secretary: G. F. Hussey Jr., Adm., USN, Ret.

October 22-24, Packaging Institute: Fall meeting, Commodore Hotel, New York. Institute address: 342 Madison Ave., New York 17. Secretary: Laurence V. Burton.

October 22-25, American Institute of Steel Construction Inc.: Fall meeting, The Greenbrier, White Sulphur Springs, W. Va. Institute address: 101 Park Ave., New York 17. Executive vice president: L. Abbott Post.

October 22-25, The Wire Association: Annual convention, La Salle Hotel, Chicago. Association address: 300 Main St., Stamford, Conn. Executive secretary: Richard E. Brown.

October 22-26, American Institute of Electrical Engineers: General fall meeting, Hotel Cleveland, Cleveland. Association address: 33 W. 39th St., New York 18. Secretary: H. H. Henline.

October 25-26, Gray Iron Founders Society Inc.: Fall meeting, Edgewater Beach Hotel, Chicago. Society address: 210 National City-E. 6th St. Bldg., Cleveland. Executive vice president: Donald H. Workman.

October 26-27, American Institute of Mining and Metallurgical Engineers, National Open Hearth Steel Committee: Annual meeting, Southern Ohio section, Deshler Wallick Hotel, Columbus, O. Institute address: 29 W. 39th St., New York 18. Section chairman: V. W. Jones, Armco Steel Corp., Middletown, O.

October 28-30, Conveyor Equipment Manufacturers Association: Fall meeting, The Homestead, Hot Springs, Va. Association address: 1129 Vermont Ave., Washington 5. Executive vice president: R. C. Sollenberger.

October 29-31, American Gear Manufacturers Association: Semi-annual meeting, Edgewater Beach Hotel, Chicago. Association address: 302 Empire Bldg., Pittsburgh 22. Executive secretary: John C. Sears.

October 29-31, National Lubricating Grease Institute: Fall meeting, Edgewatef Beach Ho-

(Continued on p. 121)

What's in Vermont this month?

THE SIX DIMENSIONS THAT CONSTITUTE A "HOLE"

A precision ground hole can be defined with six dimensions, any or all of which may be of importance, depending on the functions which the hole must perform. Without involving Mr. Einstein's fourth dimension of "Time," there are six measurable elements of a hole. These are Roundness, Squareness, Diameter, Concentricity, Squareness of hole with face, and Surface Finish. A precision hole must be made by a machine and tool which generates all surfaces. It is evident that by working within fixed limits on all dimensions that the geometry of the hole can be closely maintained.

Bryant line of precision grinders is built to generate holes with any specified dimension limits. They will grind holes Round, Straight and to Diameter tolerances within 5 to 10 millionths of an inch. Certain machines can be used to grind I.D. and O.D. in a single setting to assure Concentricity. Bryant two-spindle machines grind holes and faces in a single setting to assure Squareness. Any desired Surface Finish tolerance may be ground – less than one microinch, if desired!

An analysis of the six dimensions of a hole is contained in an unusual booklet entitled, "What's in a HOLE?" A free copy will be sent on request.

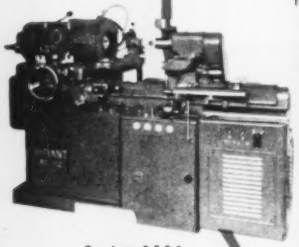
Bryant Chucking Grinder Company in Springfield, Vermont, U.S.A.

A fine line

of Internal Grinders for every tool room and production requirement

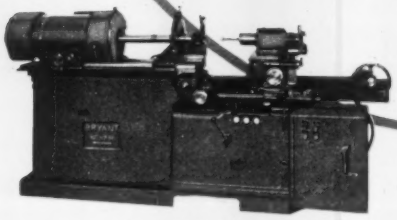
Series 1460

Series 1109

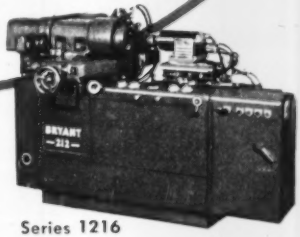


Series 1116

BRYANT has designed and built precision internal grinders for 38 years. Today, their completely modern line covers the grinding of holes from .040" to 50" in diameter. Standard and special machines will grind straight, tapered, curved and irregular holes, or any of these in combination. Face and hole grinding can be combined to assure squareness. Cams and irregular holes can be ground by using the cam attachment. The Series 1460 has a face plate 60" in diameter and will swing work up to 50". A special machine will take 100" swing. The Series 1109 is equipped with Bryant High Frequency wheelheads giving speeds up to 100,000 R.P.M. for extremely small bores. Maximum swing of the 1109 is 9". Series 1116 machines are for general purpose tool room work. They incorporate many quick-changeover features and will swing 16". The 1416 machines are similar to the 1116, but have provision for grinding long bores such as machine tool spindles. Series 1216 grinders are completely automatic and will grind bores from 5/16" to 6" in diameter. The High Frequency head is used on the 1216 for maximum efficiency on small bores. All these machines incorporate the exclusive Bryant feature of hardened and ground cylindrical slide construction and three-point bearing. Complete specifications are available on all Bryant precision internal grinders — write today.



Series 1416



Series 1216

Bryant Chucking Grinder Company in Springfield, Vermont, U.S.A.

(Continued from p. 118)

tel, Chicago. Institute address: 4638 Nichols Parkway, Kansas City 2, Mo. Executive secretary: Harry F. Bennetts.

October 31-November 2, Foundry Equipment Manufacturers Association: Fall meeting, The Homestead, Hot Springs, Va. Association address: Engineers Bldg., Cleveland 14. Executive director: Arthur J. Tuscany.

October 31-November 2, Porcelain Enamel Institute Inc.: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Institute address: 1010 Vermont Ave., N.W., Washington 5. Secretary: Edward Mackaser.

NOVEMBER

November 1-2, Industrial Management Society: Annual time-motion study and management clinic, Sheraton Hotel, Chicago. Society address: 35 E. Wacker Drive, Chicago 1.

November 1-3, Audio Engineering Society: Annual convention & audio fair, Hotel New Yorker, New York. Society address: 67 W. 44th St., New York.

November 1-4, National Tool & Die Manufacturers Association: Annual convention, Statler Hotel, St. Louis. Association address: 906 Public Square Bldg., Cleveland. Executive secretary: George S. Eaton.

November 2-3, Illinois Mining Institute: Annual fall meeting, Hotel Abraham Lincoln, Springfield, Ill. Institute address: 28 E. Jackson Blvd., Chicago 4. Secretary-treasurer: B. E. Schonthal.

November 4-7, National Screw Machine Products Association: Fall meeting of committee, directors and executive groups, The Homestead, Hot Springs, Va. Association address: 13210 Shaker Square, Cleveland 20. Secretary: Margaret Ballinger.

Nov. 7-9, Annual Mechanite Research Meeting: Hotel New Yorker, New York. Sponsor's address: Mechanite Metal Corp., Pershing Bldg., New Rochelle, N. Y.

November 7-9, National Machine Tool Builders Association: 50th annual meeting, The Homestead, Hot Springs, Va. Association address: 10525 Carnegie Ave., Cleveland. Secretary: Frida F. Selbert.

November 7-10, National Conference on Coastal Engineering: Hotel Rice, Houston. Secretary: C. E. Balleisen, c/o Southwest Research Institute, San Antonio, Tex.

November 8-10, Steel Founders Society of America: T & O conference, Carter Hotel, Cleveland. Society address: 920 Midland Bldg., Cleveland. Secretary: F. Kermit Donaldson.

November 8-11, Automotive Parts Rebuilders Association: Fall meeting, Stevens Hotel, Chicago. Association address: 1414 S. Michigan Ave., Chicago. Secretary: Jack O'Sullivan.

November 9, American Iron & Steel Institute: Regional technical meeting, Hotel Mark Hopkins, San Francisco. Institute address: 350 Fifth Ave., New York. President: Walter S. Tower.

November 12-15, National Automatic Merchandising Association: Convention & exhibit, Public Auditorium, Cleveland. Association address: 7 S. Dearborn St., Chicago 3. Executive director: Clinton S. Darling.

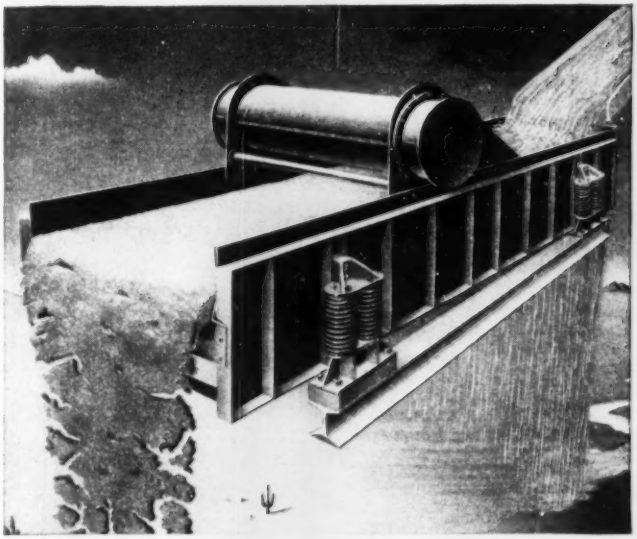
November 12-16, National Electric Manufacturers Association: Annual fall meeting, Chalfonte-Haddon Hall, Atlantic City, N. J. Association address: 155 E. 44th St., New York 17. Managing director: W. J. Donald.

November 14-16, National Metal Trades Association: Annual convention, Palmer House, Chicago. Association address: 122 S. Michigan Ave., Chicago 3. Commissioner: Homer D. Sayre.

November 15-16, The Magnesium Association: Fall meeting, Biltmore Hotel, New York. Association address: 122 E. 42nd St., New York 17. Assistant secretary: Martha I. Hanson.

November 16, Association of American Railroads: Fall conference, Blackstone Hotel, Chicago. Association address: Transportation Bldg., Washington 6. Secretary-Treasurer: G. M. Campbell.

November 26-December 1, Chemical Industries Exposition: Grand Central Palace, New York. Manager: Charles F. Roth, International Exposition Co., New York; chairman: E. R. Weidlein, Mellon Institute.



"SEPARATION CENTER" FOR SURFACE MOISTURE

Surface moisture removal is essential in processing many bulk materials. Effective dewatering at required speeds and capacities is a Hewitt-Robins specialty.

The Eliptex Dewaterizer® . . . a Hewitt-Robins "first" . . . has proved its versatility in removing surface liquid from bulky solids, granular materials and fibers alike—and for recovering solids, effluent, or both. Unique vibratory action and patented deck* assure consistent, economical performance in "damp-drying" coal, petroleum coke, slurry, wood bark or pulp, aggregates, fine limestone or other wet substances.

If dewatering bulk materials is vital to your production . . . if inadequate removal of surface moisture affects product quality, output or economy . . . it will be worth while to explore the space- and labor-saving advantages of the Hewitt-Robins Eliptex Dewaterizer.

Hewitt-Robins has long been a pioneer in the development of vibrating machinery for dewatering, sizing, purifying and shaking out bulk materials—and for salvaging fines from waste. If any of these problems are *yours*, we invite you to make them *ours*.

441, S. Patents 2,700,724 & 2,457,018

HEWITT HR ROBINS

Executive Offices: 370 Lexington Avenue, New York 17, N. Y.

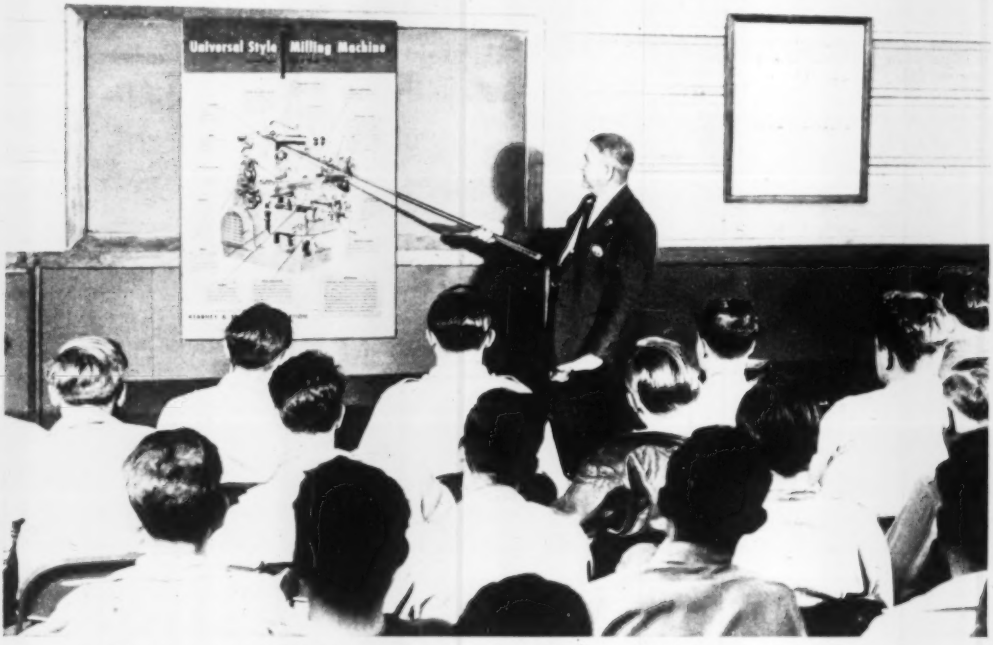
HEWITT RUBBER DIVISION: Belting, hose and other industrial rubber products

ROBINS CONVEYORS DIVISION: Conveying, screening, sizing, processing and dewatering machinery

ROBINS ENGINEERS DIVISION: Designing and engineering of materials handling systems

Hewitt-Robins is participating in the management and financing of Kentucky Synthetic Rubber Corporation

HOW TO SPEED UP TRAINING OF MILLING MACHINE OPERATORS



Kearney & Trecker visual training aids can

Save time training operators . . . Help train supervisory personnel . . . Improve vocational school machine shop courses

FILM COURSE — We will loan you, without charge, a complete sound-slide, five-part training film (in color) which deals with good machine tool practice. Special emphasis on the use and purpose of the milling machine. Complete with instructor's guide.*

ELEMENTARY HANDBOOKS — Book I, "The Right and Wrong in Milling Practice," covers operation of the milling machine including job setup, taking the cut, selection and care of cutters, housekeeping and safety precautions.

Book II, "The Milling Machine and Its Attachments" covers the principles of milling machine design, construction and attachments.

Books I and II are 50 cents each. Make remittance out to Kearney & Trecker Corp., Milwaukee 14, Wisconsin. Check or money order.* No C.O.D.'s or stamps please.

POSTER STUDYVIEW OF UNIVERSAL STYLE MILLING MACHINE — This big 40" x 60" color studyview of a universal milling machine gives the beginner a clearly defined illustration of the machine, its construction and elements of operation and maintenance. No charge.*

**All applications should be made on official company or school letterhead. Trainees can make individual purchases of Books I and II without official letterhead. Instructors can make group purchases of Books I and II.*

As a service to industry and education, Kearney & Trecker offers three popular visual aids to complement your training of milling machine operators.

These visual aids can help you train operators faster . . . do a more complete job. They help you do the kind of training that saves money out in the shops — speeds up schedules and minimizes costly mistakes. Look over the descriptive material below and send for the ones that can help you. Kearney & Trecker Corp., 6784 West National Avenue, Milwaukee, Wisconsin.

KEARNEY & TRECKER MILWAUKEE MACHINE TOOLS

New Products and Equipment

Valve Face Grinder Is Automatic

An automatic valve face grinder, made to grind faces of internal combustion valves, is a development of Landis Tool Co., Waynesboro, Pa. In operation, automatic loader feeds valves from a conveyor, carries them on an inclined rack and inserts them in the headstock. Hydraulic clamping

positions and holds the valves in the headstock during grinding operation.

Grinding wheel base and loader are synchronized in a timed cycle. After valve is loaded in the headstock, wheel base advances rapidly to grinding position, proceeds with slow continuous grinding feed to a predetermined size, sparks out and retracts. Valves are ejected automatically after grinding. The grinding wheel is 24 inches in diameter and is driven by a 7½ hp motor. Microsphere bearings are used for both headstock and wheel spindle. Automatic wheel dressing mechanism dresses wheel after a selected number of valves are ground.

Check No. 1 on Reply Card for more Details

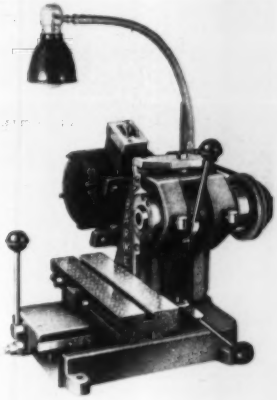
Constant Current Regulator

Subway type CMH constant current regulator made by Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa., is an oil-cooled automatically controlled unit that can operate, if necessary, submerged in water. Hipersil core construction is responsible for smaller size, lighter weight and increased efficiency. Heavy tank construction produces longer life and extra ruggedness. New wiping sleeve and pothead construction result in minimum space requirements. Internal cable connections simplify installation and location of terminals above oil level provide maximum accessibility. Regulators are available in ratings of 3, 5, 7½, 10, 15, 20, 25 and 30 kw, with primary voltages of 2400 or 4800, and secondary current of 6.6 or 20 amp at 60 cycle.

Check No. 2 on Reply Card for more Details

Miller Has 3-Way Hand Lever

Barker Engineering Co., 500 Green Rd., Cleveland 21, O., offers bench-type miller developed for rapid production milling of small parts at close tolerances. Machine has 9-inch longitudinal table travel, 2½-inch transverse saddle travel and 3-inch vertical head travel by hand lever operation on the production model. Tool room model embodies the same travels operated by accurately calibrated micrometer feed screws. Any one or



more of the three travels is furnished with micrometer feed screw in place of hand lever.

Spindle is hardened and ground nickel, mounted on precision bearings. Cutter end rotates in a preloaded double roll ball bearing. Standard spindle is hollow and machined to take standard collets from 1/16 to ½-inch diameter. Motor is ¼ hp, 1750 rpm, heavy duty ball bearing; spindle speeds are 875, 1750 and 3500 rpm.

Check No. 3 on Reply Card for more Details

Desk-Model Copying Machine

Copies up to 16 inches wide, at a rate of 1000 an hour, can be made on a copying machine developed by Ozalid Division, General Aniline & Film Corp., Johnson City, N. Y. Printing and development speeds are synchronized up to 30 fpm. High pressure mercury vapor quartz lamp operating at 1200 watts provides light source. Transformer is a constant wattage stabilizer that maintains printing speeds by controlling voltage fluctuations within the 105-125-v range. Electrical consumption is 20 amp at 110 v ac, 60 cycle. Power factor is corrected to 85 per cent.

Developer system is brought to correct operating temperature in a few minutes by a thermostat heat control. Manually adjustable, single feed regulator starts, stops and controls gravity fed ammonia flow. Copies can be made directly from any translucent original; or from opaque originals with one intermediate stop. Width of copier is 28½ inches; height, 27 inches, depth, 35½ inches.

Check No. 4 on Reply Card for more Details

Drill Adjustment Simplified

Improvements made on the Sterling drill and carbide grinder by McDonough Mfg. Co., 1500-1600 Galloway St., Eau Claire, Wis., include an adjustment simplified to compensate for grinding wheel wear. Result of the modification is increased accu-

racy in setting the machine for various drill diameters. Also added is a diamond wheel dresser, mounted permanently on the drill grinding wheel guard.

On the carbide tool grinding side, a graduated quadrant is added to the table, to simplify setting clearance angles accurately. A diamond holder for dressing the wheel on this end is also furnished as standard equipment. A light fixture mounted on flexible tubing is another refinement that is now standard equipment. In addition

to grinding standard drills, three lip core drills can be ground with equal speed and accuracy.

Check No. 5 on Reply Card for more Details

Remote Transmission Control

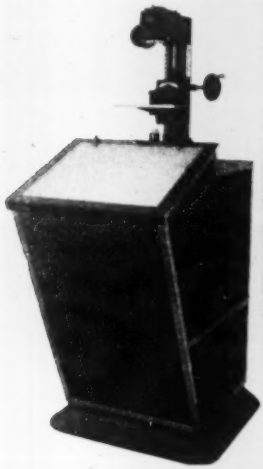
Remote electrical control for its line of 1/12 to 5 horsepower variable speed transmissions is announced by Graham Transmissions Inc., 3754 North Holton St., Milwaukee 12, Wis. Four bolts are used to mount control on transmission or the unit may be added to standard control of drives already in operation. A switch is furnished for mounting to regulate speed and is available with speed indicator at the remote point. Speed indicator can be designed to indicate any calibration desired for a particular application, and changes in speed setting can be made while the transmission is operating.

Check No. 6 on Reply Card for more Details

Optical Comparator

A power cooled condenser lens unit that provides crisp screen definition is one feature of an optical comparator introduced by Portman Instrument Co., 6 Manhasset Ave., Port Washington, N. Y. Designated model C-100, the comparator's intensity and shading of light can be varied when used with color filters. Design of the staging assembly provides large working space, includes swing feature that permits moving entire stage and workpiece to one side to change lens units without disturbing work setup. Stage assembly can be adjusted for helix angle positioning by built-in controls.

Optical system is designed to complement comparator's large mechanical capacity. Focal lengths exceed



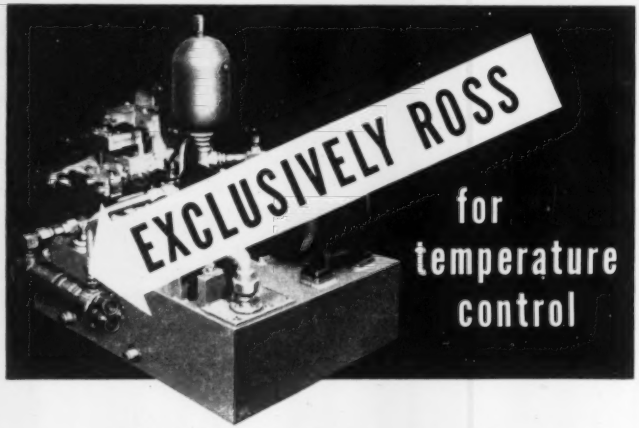
3 inches; the screen image is oriented with respect to the position and movement of the projecter part. Ordered as standard equipment are magnifications of 10X, 20X, 25X, 31½X, 50X, 62½X and 100X. Sight-line screen and frame of 16 x 20 inches permits use of drafting instruments. Comparator's height is 64 inches; width, 23 inches; depth, 35 inches; and net weight, 350 pounds.

Check No. 7 on Reply Card for more Details

Motor Is Explosion Proof

Totally enclosed motor for explosion-proof requirements is a development of U. S. Electrical Motors Inc., 200 East Slauson Ave., Los Angeles 54, Calif. Unit is made in capacities from 3 to 75 hp and carries underwriters' label in Class I, Group D for highly inflammable gases and volatile liquids; in Class II, Groups F and G, for combustible dusts. The motor is made in two types, designated SE and SES.

Features incorporated include: sealed terminal, elongated spark-arresting bearing sleeves, high-draft



...in HYDRA-FLASH hydraulic units

"Extensive tests determined the choice of Ross Exchangers for all Hydra-Flash hydraulic power units," says Kingsley A. Doutt, the manufacturer.

With a pressure operating range of 400 to 1000 PSI, Hydra-Flash operates flash welders having transformer capacities up to 500 KVA and upset cylinder areas up to 76 sq. in. This versatile and thoroughly automatic unit constantly depends on a uniformly safe and effective oil temperature range not exceeding 120 degrees F. The Ross Type BCF Exchanger delivers it — with complete freedom from failures through pump slippage and accelerated breakdown of vital oil properties.

Compact and fully standardized, of all-copper and copper alloy construction Ross Type BCF is today the most widely used exchanger for hydraulically operated equipment.

See many diversified applications for yourself on the hydraulic equipment of leading manufacturers. Write for broadside No. 1.1K4. It's a picture gallery of many names and much equipment you know and respect for outstanding quality. Your copy on request.

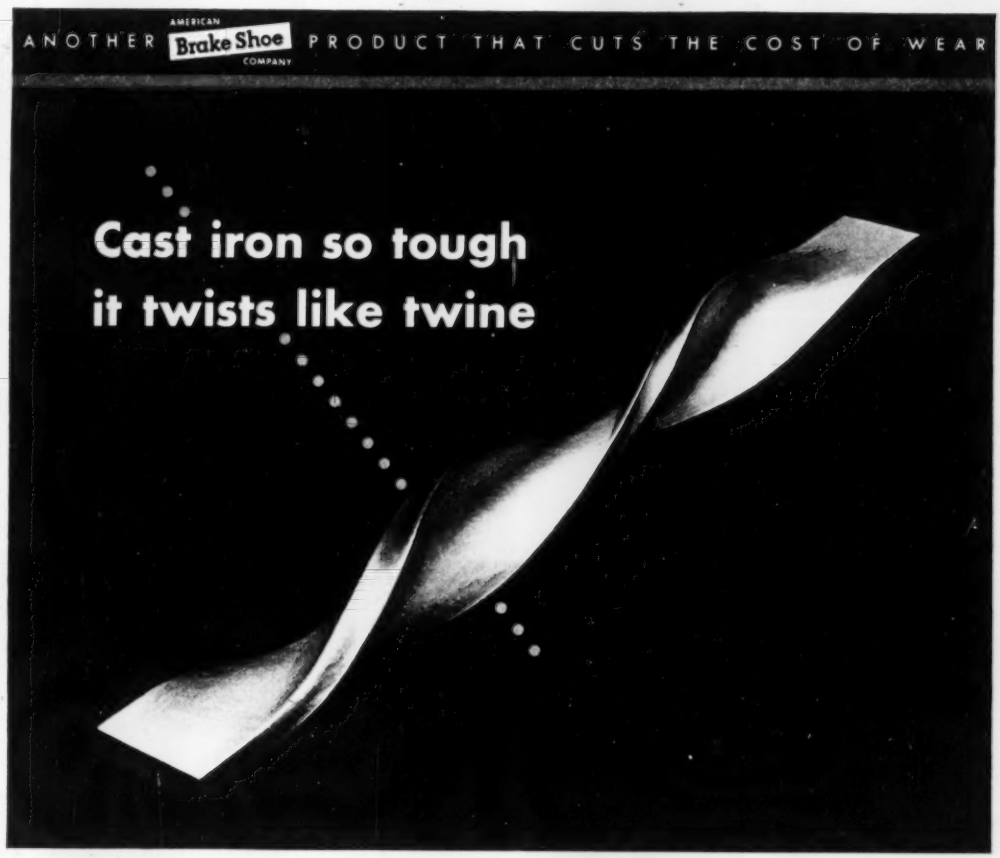
ROSS HEATER & MFG. CO., INC.
Division of American Radiator & Standard Sanitary Corporation
1431 WEST AVE. BUFFALO 13, N. Y.
In Canada, Horton Steel Works, Limited, Fort Erie, Ont.

ROSS

EXCHANGERS

Serving home and industry— AMERICAN-STANDARD • AMERICAN BLOWER
CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILERS • ROSS HEATER • TONAWANDA IRON

ANOTHER AMERICAN Brake Shoe COMPANY PRODUCT THAT CUTS THE COST OF WEAR

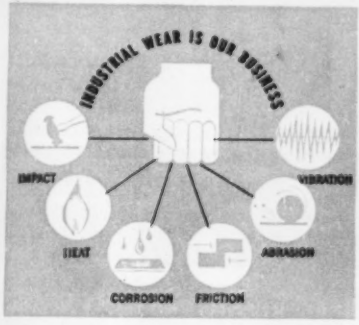


Ductile Iron—A New Metal . . . Offers New Possibilities To Industry!

Unlike many irons, you can bend it, twist it, hit it or heat it and it stands up. Ductile iron is tough. It is stronger than mild steel. This remarkable metal possesses the desirable qualities of cast iron together with many of the advantages of steel. It frequently replaces steel in applications, such as gears, crankshafts, pressure castings, dies and pipe at a lower cost.

Ductile iron may be cast in large or small castings in intricate shapes that are difficult or impossible to cast in steel. It can be cast with a fine surface and to close tolerances. It can have the unique property of combining a chilled surface with a tough ductile core which gives it excellent abrasion resistance and considerable shock resistance. It can be welded to iron, or steel in a strong, tough bond. It has good machinability.

The potential uses of ductile iron are nearly endless because it combines a wide range of properties with a competitive cost. Our engineers will be glad to work with you in finding how ductile iron may be applied to your problem. Write Department G, American Brake Shoe Co., 230 Park Avenue, New York 17, N. Y. for literature on ductile iron.



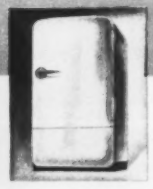
AMERICAN Brake Shoe COMPANY
230 PARK AVE., NEW YORK 17, N.Y.

10 Divisions of American Brake Shoe Co. produce wear-resisting parts in 33 American and Canadian plants.
AMERICAN BRAKEBLOK DIVISION • AMERICAN FORGE DIVISION • AMERICAN MANGANESE STEEL DIVISION
BRAKE SHOE AND CASTINGS DIVISION • ELECTRO-ALLOYS DIVISION • ENGINEERED CASTINGS DIVISION
KELLOGG DIVISION • NATIONAL BEARING DIVISION • RAMAPO AJAX DIVISION • SOUTHERN WHEEL DIVISION

Copyright 1951, American Brake Shoe Company

How ICE CUBES get SQUARE

Has it occurred to you that modern home appliances such as ranges and refrigerators must be provided with leveling adjustments? Floors often are not level; therefore, a special Ⓑ leveling bolt is used under each corner of your refrigerator. These bolts give the housewife level trays of liquids—they assure that the refrigerator door swings properly—and even the ice cubes are always on the square!



APPLICATIONS

For Refrigerators, Ranges, Washing Machines, Oil Burners, and similar appliances, either movable or stationary.

There's a special job to do and a special Ⓑ bolt does that job. The extremely large head plus the high strength of this rust proof bolt meet the problem. Control from the raw billet to the finished bolt is one reason for quality. Other leveling applications for these bolts are many. They can be furnished with anti-skid or smooth surfaces; with shoulder for wrench adjusting, or made to suit your particular specifications. We'll gladly help you "keep it on the level."

QUALITY...
from Blueprint to Product!

BUFFALO BOLT COMPANY
Division of Buffalo-Eclipse Corporation
NORTH TONAWANDA, NEW YORK
Sales Offices in Principal Cities. Export Sales Office: Buffalo International Corp., 50 Church Street, New York City

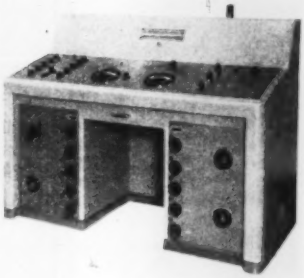
Our Specialty is **"SOMETHING SPECIAL"**

ventilation, removable cover, split hub fan, asbestos-protected windings, and solid, centricast rotor. Protection against such external hazards as abrasives, acids or moisture is assured through the complete seal incorporated in the design.

Check No. 8 on Reply Card for more Details

Magnetic Testing Desk

A magnetic testing desk, designed for routine dc magnetization and hysteresis tests and simple flux measurements is offered by Special Products Division, General Electric Co., Schenectady 5, N. Y. The desk is used in conjunction with various permeameters and magnetic devices to test soft magnetic sheet and strip



and high-coercive-force compositions such as alnico, silmanal and cobalt platinum magnet alloys.

Instruments are enclosed completely in the lightweight aluminum desk, adding to its safety as well as protecting equipment from dust and physical abuse. Sloping desk top places all controls within easy reach of seated operator. It operates on any moderately steady 120 v dc or 150 v, 60 cycle ac current. Normal range of current control, depending upon auxiliary equipment, extends from 0 to 40 amperes.

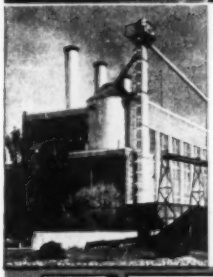
Check No. 9 on Reply Card for more Details

Guns Spray at High Speeds

Two metallizing guns developed by Metallizing Engineering Co. Inc., 38-14 30th St., Long Island City 1, N. Y., develop some of the highest spraying speeds available in hand held guns. The guns approach automatic operation by incorporating a jet siphon principle in the gas head that automatically compensates for variations in gas pressure as high as 10 pounds. Also included is an automatic wire feed control that compensates for wire irregularities such as kinks and reel stand drag.

Metco type 4E sprays all wires

MOVING SOMETHING* from HERE



The other day someone asked us what Jeffrey did. Quick as a flash we said: "If you have something to move from here to there, we can do it." Yes, and all sorts of devices with which to do it. Besides, we can process it (cool, dry, screen, feed, pack and elevate it) . . . reduce it, if necessary, to desired fineness so that something else may be done with it.

Material handling, processing and reducing . . . that's our business. That's where we can be of real service to you. Jeffrey builds many types of conveyors —some that cannot be found elsewhere—bucket elevators, feeders, packers, dryers, coolers, screens, bin valves, chains of all kinds, crushers and pulverizers, car pullers, transmission machinery, etc.

Our engineers know a great deal about modern material handling methods and reduction machinery . . . know how to fit them into your plant layout to provide fast, straight-line production . . . more profit for you. Convey your problem to them and let them give you a lift.

*SOMETHING takes in a lot of territory. But Jeffrey has a diversified line just as there are many kinds of material. Whether it's loose bulk or packaged, we can speed it on its way—at minimum cost and to your complete satisfaction.

to HERE

THE JEFFREY MANUFACTURING COMPANY

889 North Fourth St., Columbus 16, Ohio

ESTABLISHED 1877

Complete Line of Material Handling, Processing and Mining Equipment

JM

NON-FLUID OIL

TRADE MARK REGISTERED

Stays in Overhead Crane Motors

Constant oil and grease leakage from overhead crane motors not only results in high lubricant and application costs, but also stock cleaning costs are increased when oil deposits must be removed. In fact, on sheet metal products, it is virtually impossible to remove these spots in the pickling process or even when the sheets are annealed.

The answer? NON-FLUID OIL . . . saves time and money because it does not drip or leak. You get *clean* lubrication and *clean* products at lower costs.

Write for instructive bulletin and free testing sample of NON-FLUID OIL.

NEW YORK & NEW JERSEY LUBRICANT CO.

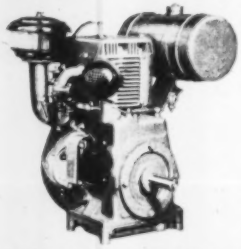
292 Madison Ave., New York 17, N. Y.
Works: Newark, N. J.

55th ANNIVERSARY NON-FLUID OIL

WAREHOUSES: Atlanta, Ga. • Birmingham, Ala. • Charlotte, N. C. • Detroit, Mich. • Chicago, Ill. • Columbus, Ga. • Greensboro, N. C. • Greenville, S. C. • Providence, R. I. • St. Louis, Mo.

NON-FLUID OIL is not the name of a general class of lubricants, but is a specific product of our manufacture.

The POWER ADVANTAGE Story of the Model AEN Single-Cylinder WISCONSIN *Air-Cooled* ENGINE



Here's more power . . . less weight . . . lower cost . . . all with no sacrifice in heavy-duty construction and serviceability in this Model AEN single-cylinder Wisconsin Engine. Features include:

1. Dependable air-cooling under all climatic and weather conditions.
2. Self-cleaning tapered roller bearings at both ends of the crankshaft withstand either side-pull or end-thrust without danger to bearings.
3. Rotary type high tension OUTSIDE Magneto with Impulse Coupling operates as an entirely independent unit that can be serviced or replaced in a few minutes.
4. Maximum torque at usable speeds for equipment that really has to go to work.

Our engineering department will gladly cooperate with you in adapting Wisconsin Engines to your requirements. Write for detailed data and name of the nearest Wisconsin distributor.

CONDENSED SPECIFICATIONS

Bore	3"
Stroke	3¼"
Piston Displacement	23 cu. in.

HORSEPOWER

5.1 H.P. at 1800 R.P.M.
6.4 H.P. at 2200 R.P.M.
7.2 H.P. at 2600 R.P.M.
7.5 H.P. at 3000 R.P.M.

No. of Piston Rings		4
Fuel Tank Capacity		1.7 Gals
Weight, lbs.	Net	Crated
Standard Engine	110 lbs.	135 lbs.

WISCONSIN MOTOR CORPORATION

World's Largest Builders of Heavy-Duty Air-Cooled Engines

MILWAUKEE 46 WISCONSIN

from 20 B & S gage to ⅛-inch in any metal. Type 5E is designed specifically for high speed spraying of the softer metals, for protection of equipment and structures against corrosion. It sprays ⅛-inch wire, depos-

iting as much as 55 pounds of zinc or 15 pounds of aluminum per hour. In production line work the guns can be mounted on a lathe or other machine.

Check No. 10 on Reply Card for more Details

Truck Inverts Pallets Easily

Load inverter originally developed for the dairy foods industry by Baker Industrial Truck Division, Baker-Raulang Co., 1250 W. 80th St., Cleveland 2, O., is adaptable to any operation requiring regular inverting of palletized loads. Attachment consists of revolving head and a set of top and bottom forks, with plywood backstop and side retaining board.

To invert a load, the operator moves truck with attachment set so plywood retainer is vertical and with an empty pallet carried on top forks. After load is lifted, it is turned 180 degrees by revolving head and positioned by retaining board until turn is complete. Attachment can be installed easily on any Baker 3000 or 4000-pound capacity fork truck.

Check No. 11 on Reply Card for more Details

Oven Protects Electrodes

Mineral-coated electrodes are protected against moisture absorption until their use in the welding line by the DryRod electrode oven, made by Philip Roden Co., 1721 E. Lake Bluff Blvd., Milwaukee 11, Wis. The oven is a portable heated storage unit that controls moisture content and temperature of electrodes at their point of use. Moisture is controlled accurately to within 0.2 per cent.

Oven is basically a cylindrical,

*"Another Caravan Axle!"

In Amsterdam or Albuquerque . . . it's performance that counts! And CARAVAN axles are recognized *around the world* for their outstanding performance.

Sturdy and dependable, United CARAVAN axles provide mobility for compressors, military equipment, fire-fighting apparatus, pumps, concrete mixers, welders, generators and many other diversified types of portable equipment weighing up to 12,000 pounds.

Both single axle (2-wheel) assemblies and 4-wheel running gear equipped with automotive-type steering are available to meet a wide range of requirements. In addition, units of either straight or drop-type construction can be supplied.

CARAVAN axles have gained world-wide recognition, as the Dutch boy's exclamation indicates, because of their versatility and dependable performance.

Write today for United's 12-page, illustrated CATALOG NO. 101. This catalog contains specifications on the complete line of CARAVAN axles and describes an automatic surge-control braking device, a retractable third-wheel assembly for 2-wheel units and other CARAVAN accessories.

229-UM

THE UNITED MANUFACTURING CO.

1019 Interstate Street • Bedford, Ohio

GET RID OF UNWANTED HEAT FASTER, AT LESS COST WITH . . .

Republic Rubber ASBESTOS COVERED Cooling Hose

● Cold water, delivered through Republic Rubber Asbestos Covered Furnace Door Cooling Hose, works more efficiently to carry off unwanted heat!

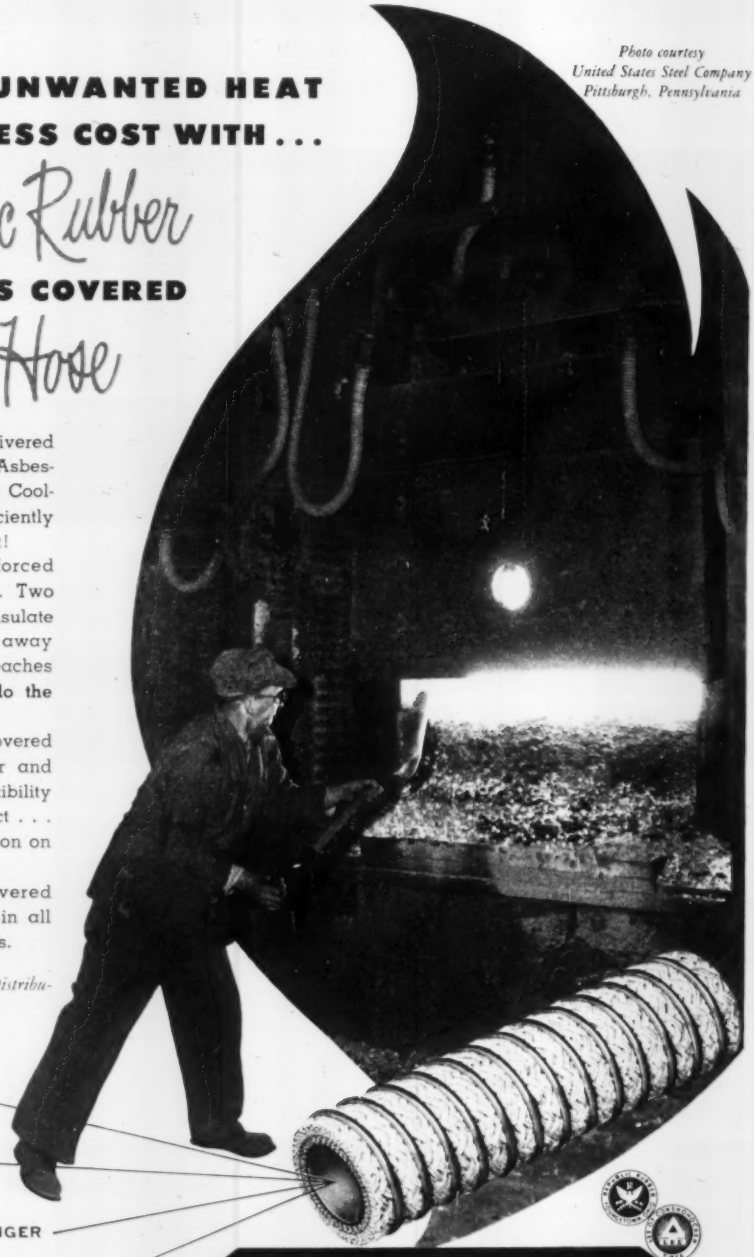
Exterior is wire-reinforced against mechanical abuse. Two plies of braided asbestos insulate the hose and keep the heat away from the coolant until it reaches the place where **it will do the most good.**

Republic's Asbestos Covered Cooling Hose lasts longer and costs less to use. Its flexibility makes it easy to connect . . . makes it ideal for installation on moving parts.

Republic Asbestos Covered Cooling Hose is supplied in all standard sizes and lengths.

Contact your local Republic Distributor or write direct for full facts.

Photo courtesy
United States Steel Company
Pittsburgh, Pennsylvania



INDUSTRIAL RUBBER PRODUCTS BY
REPUBLIC RUBBER DIVISION
Lee Rubber & Tire Corporation
YOUNGSTOWN, OHIO

compartmented sheet metal unit, heated by an 840-w element operating off 110 or 220-v circuits. Its efficiency is enhanced by insulation that minimizes heat loss. A variable thermostat controls temperatures closely up to 600° F. The unit is 22 inches OD by 25½ inches long, with capacity for 250 pounds of electrodes up to 18 inches in length.

Check No. 12 on Reply Card for more Details

Hopper Added to Speed Truck

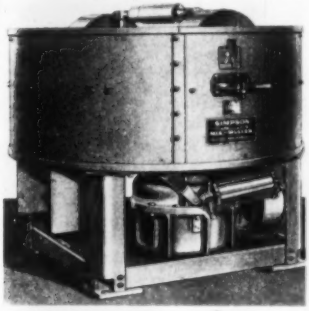
Addition of ½ cu yd, Roura, self-dumping hopper to its model 2500 speed truck is announced by Kalamazoo Mfg. Co., 1827 Reed St., Kalamazoo 24F, Mich. Installation of the hopper unit permits most liquid or

dry materials to be handled economically. Truck is powered by a 2-cylinder, 13 hp engine, has a heavy-duty three speed transmission and single drive plate tractor type clutch. Capacity with standard pneumatic tires is 2000 pounds; with optional heavy-duty tires, 3500 pounds. Truck's speed is 15 mph and turning radius is 64 inches. Wheel base is 39¼ inches.

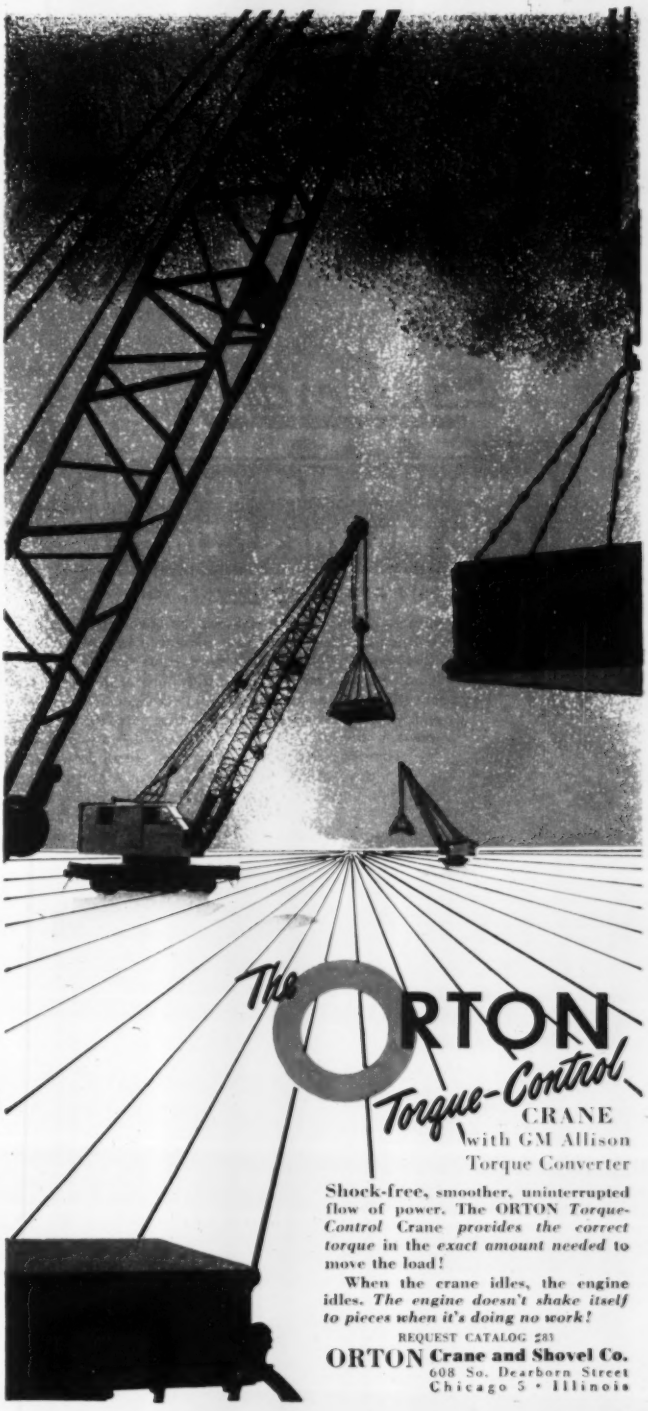
Check No. 13 on Reply Card for more Details

Mixers Increase Pressure

Large capacity intensive Mix-Mullers, the Simpson models 2F and 3F, are offered by National Engineering



Co., 547 W. Washington St., Chicago 6, Ill. Mixers utilize a concept of sand preparation that makes possible increased muller pressures with a mini-


The ORTON
Torque-Control
CRANE
with GM Allison
Torque Converter
Shock-free, smoother, uninterrupted flow of power. The ORTON Torque-Control Crane provides the correct torque in the exact amount needed to move the load!
When the crane idles, the engine idles. The engine doesn't shake itself to pieces when it's doing no work!
REQUEST CATALOG 283
ORTON Crane and Shovel Co.
608 So. Dearborn Street
Chicago 5 • Illinois

mum of muller inertia. Unit has spring adjusted mullers to provide correct pressure for specific type of sand being conditioned. Batch capacity of the model 2F is 2000 pounds; of the model 3F, 4000 pounds. Model 2F operates at 25-30 hp; model 3F, at 60-75 hp. Sand output is 30 tons per hour on model 2F and 60 tons per hour on 3F.

Check No. 14 on Reply Card for more Details

Lift Is Also Side-Shifter

Simple change in adjustment of a lift carriage assembly developed by Baker Industrial Truck Division, Baker-Raulang Co., 1250 W. 80th St., Cleveland 2, O., converts the standard fork truck to a side-shifing unit. From one adjustment it functions as a standard fork and clamp truck for ordinary handling. Conversion to side-shifting operation is accomplished by changing one pin and block. Lateral movement of the forks in each case is operator-controlled by a lever located on the dash. Action is hydraulic, with roller conveyor chain linkage. Side shifting operation is available on 2000 to 4000-pound capacity trucks, in 36, 42 and 48-inch outside fork spread providing 17 inches of fork-spacer and clamp action at 4¼ inches lateral movement each side of center.

Check No. 15 on Reply Card for more Details

Hardens Steel with Torch

Two compounds for emergency surface hardening of small tools or parts with an ordinary torch are introduced by Eutectic Welding Alloys Corp., Flushing, N. Y. Instant Hardner No. 1 hardens steel tools, parts, edges, threads, dies, drills, etc., quickly without conventional heat treating. Instant Hardner No. 2, while applied in a similar manner to No. 1, is strengthened with small hard facing particles mixed right into the compound. When heated, hard particles fuse with parent metal to give a combination of hardening and hard overlay.

Check No. 16 on Reply Card for more Details

Electrocast Spray Masks

Masks for decorating and identifying products requiring simple or elaborate color schemes are available from Jas. H. Matthews & Co., Pittsburgh 13, Pa. The spray mask is a shell-like mold that fits snugly over an object to be colored. Surface of the object to remain protected is covered by the mask while cavities in the mask permit color to be applied on desired parts. Each mask is electrocasted to conform to every contour of a product.

Check No. 17 on Reply Card for more Details

For Accurate Alignment

Driv-Lok Pin Co., Sycamore, Ill., introduces Lok Dowels, precision grooved pins which provide a simplified method of establishing and retaining accurate alignment between component parts of any mechanical devices, machine components, dies, jigs and fixtures. Pins are immune to shock and vibration.

Check No. 18 on Reply Card for more Details

All-Purpose Microfilm Machine

Dual Film-A-Record, an all purpose microfilm machine announced by Remington Rand Inc., New York 10, N. Y., copies both sides of a document simultaneously or one side only on either 16 or 35 mm film. It photographs up to 500 checks or 125 feet of paper a minute. Unit may be fed automatically or by hand.

Check No. 19 on Reply Card for more Details

Outside Spindle Type Center

Red-E antifriction superaccurate center that mounts to an independent chuck is offered by Ready Tool Co.,

Spincraft
SKILL WILL DO IT

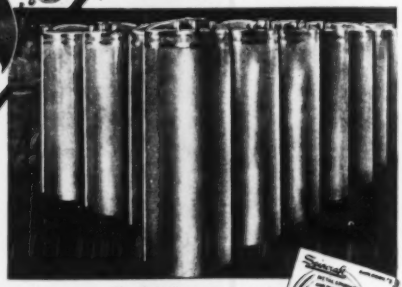
Production Methods Help You Gain Months of Time

Costs are *much lower*, too

Whenever emphasis is on speed in delivery, or lower costs, consider Spincraft metal fabricating. Of all methods available for cold shaping flat or rolled sheet metals, the spinning lathe, plus special Spincraft forming skills, offers the fastest and least expensive means of getting production rolling. As an example, consider the parts and assembly for the water sterilizer unit illustrated here. From a scratch start Spincraft made required tools, produced components and assembly and began delivery ten days after receipt of the order. Months of time were gained, thousands of dollars saved.

Cases like this are everyday experiences at Spincraft — on both small and large runs. The answer you want cannot be guaranteed, but others have been helped so often and so well that Spincraft has become the world's largest metal spinning and fabricating plant. Call or write

Components for stainless steel water sterilizer — spun, fabricated and assembled in record time at lowest cost.



The function, scope, mechanics and economics of Spincraft metal spinning and fabricating are discussed in this stimulating 40-page, well-illustrated booklet. A copy is yours for the asking.

Spincraft
SKILL WILL DO IT
INCORPORATED

Heretofore known as Milwaukee Metal Spinning Co.

4151 W. State St.
Milwaukee 8, Wis.

38 factory-trained field men
in constant circulation

THE BEST ten SOURCES FOR MECHANICAL SPRINGS

10

WALLACE BARNES COMPANY
BRISTOL, CONNECTICUT

THE WILLIAM D. GIBSON COMPANY
1800 CLYBOURN AVE.
CHICAGO 14,

RAYMOND Manufacturing COMPANY
CORRY, PENNSYLVANIA

BARNES-GIBSON-RAYMOND
40300 PLYMOUTH RD.
PLYMOUTH, MICH.

B·G·R COOK PLANT
ANN ARBOR
MICHIGAN

F. N. MANROSS AND SONS CO.
BRISTOL
CONNECTICUT

OHIO DIVISION
1712 EAST FIRST ST.
DAYTON, OHIO

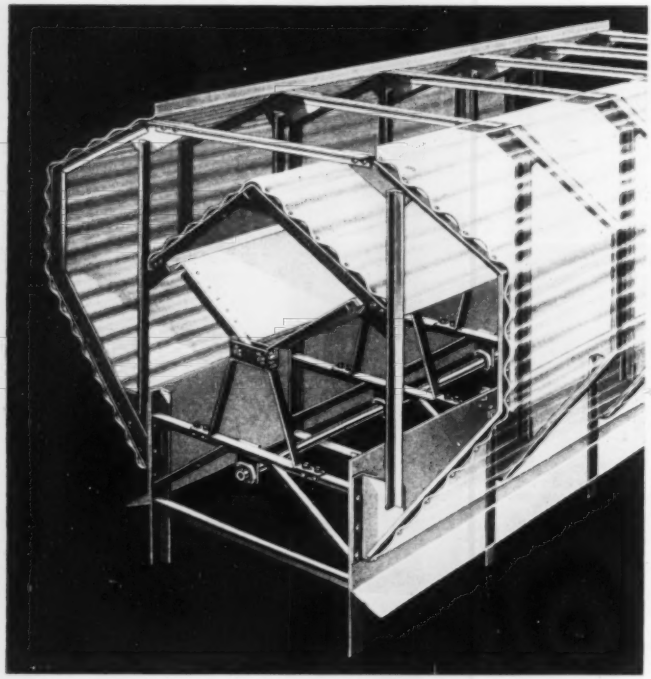
DUNBAR BROTHERS COMPANY
BRISTOL, CONN.

MILWAUKEE DIVISION
341 E. ERIE ST.
MILWAUKEE, WIS.

THE WALLACE BARNES COMPANY LTD.
HAMILTON, ONT.
CANADA

DIVISIONS OF
ASSOCIATED SPRING CORPORATION
AND CANADIAN AFFILIATE

WHEN AIR IS BAD



REMOVE FUMES, SMOKE AND HEAT WITH BURT MONOVENT

The Burt Monovent Continuous Ridge Ventilator is particularly efficient in heavy industry—steel mills, foundries, forge shops, etc.

Installed as a continuous unit the entire length of the building, Burt Monovent converts the roof line to a giant valve that exhausts bad air rapidly from the whole structure. Standard production sizes from 1" to 96" widths handle almost any application.

The Monovent is remarkably efficient. It can be installed on any type roof. And, its simplicity and heavy construction assure long, trouble-free life with almost no maintenance. See Sweet's for further details or write for bulletin S.P.V.6.

FAN & GRAVITY VENTILATORS • LOUVERS • SHEET METAL SPECIALTIES

The Burt Manufacturing Company

905 So. High St. Akron II, Ohio

Bridgeport, Conn. It is designed to provide an accurate center for applications such as turning irregular shaped pieces and accurate alignment of the headstock when turning uncentered work such as forgings, castings, etc. It is mounted to the outside spindle of the tailstock and held secure by a hardened ground tapered bushing.

Check No. 20 on Reply Card for more Details

Nylon-Lined Bearing

Nylined bearing, developed by Thomson Industries Inc., Manhasset, N. Y., consists of an outer sleeve of an inexpensive metal and a relatively thin lining of nylon bearing material. The liner is retained in the outer sleeve in a manner that will permit it to expand and contract circumferentially around inner periphery of the outer sleeve. It is available in plain sleeve or flange type.

Check No. 21 on Reply Card for more Details

Radiation Dosage Rate Meter

Alpha beta gamma survey meter with an option probe for alpha detection is announced by Tracerlab Inc., Boston 10, Mass. Developed for use as a radiation dosage rate meter and as a low level contamination monitor, the SU-5A is helpful in the laboratory for checking glassware, benchtops, hands, etc., and in locating relatively small amounts of spilled radiochemicals.

Check No. 22 on Reply Card for more Details

Selective Numbering Heads

Selective numbering heads, model 83, for stamping operation requiring quick selective numbers are offered by Numberall Stamp & Tool Co., Staten Island 12, N. Y. Wheels are engraved with direct sight figures at front of machine, set to required character by turning knobs.

Check No. 23 on Reply Card for more Details

Wires with Copper Coating

Electroplated copper on steel wire is announced by Kenmore Metals Corp., Jersey City 2, N. J. Copper on wires provide electrical conductivity at high frequencies which is comparable to that of solid copper wire. It also provides increased dimensional stability and mechanical strength.

Check No. 24 on Reply Card for more Details

Seals Gaskets and Joints

A new compound for sealing gaskets and threaded joints of all types is announced by Chicago Gasket Co., Chicago 22, Ill. Known as Graycote, it is composed of six basic ingredients, chief of which is a spongy metallic

Oil Pump Screens

Gasoline Strainers

Carburetor Filters

Air Cleaners

Cowl Ventilators

Oil Pan Strainers

Radiator Grilles

Brake Lining

from **BRAKE LINING TO RADIO GRILLES**

Radio Grilles

Automatic Drive Filters

Clutch Housing Ventilators

Floating Type Oil Intakes

Hot Water Heater Grilles

Hot Air Heater Grilles

Crankcase Backing

Clutch Housing Ventilators

Cylinder Block Oil Strainers

wire cloth
FOR AUTOMOBILES

America's largest automobile producers carry creative engineering into the production of every part, however small. Reynolds engineers and metallurgists are equally creative in making Reynolds wire cloth to meet even the most exacting of automotive specifications—from metal to mesh and from wire to weave—which contributes its share to the smooth performance, better service and longer life of the modern automobile. If you use wire, perhaps your product may be improved by consulting Reynolds engineers. No obligation.

REYNOLDS WIRE DIVISION
NATIONAL-STANDARD COMPANY

DIXON, ILLINOIS

NS NATIONAL-STANDARD Company NILES, MICHIGAN

More Wearing Comfort--
More Willingness to Wear

The NEW WILLSON "800" Series
Chemical Cartridge Respirators

1. Lightweight, molded rubber facepiece—soft, snug-fitting comfort.
2. Resilient, rolled, feathered edge—tight, effective seal.
3. Flexible, molded chin cup—comfortable and secure.
4. Adjustable, elastic head and neck bands.
5. Self-adjusting fit over bridge of nose—without reinforcement.
6. Improved exhalation valve—located out of the way at bottom of respirator.
7. Dual chemical cartridges—absorb and chemically filter gases and vapors in low concentrations. Organic vapor cartridges approved by U. S. Bureau of Mines.
8. Large filtering areas—easy breathing with minimum resistance.

WILLSON®
"Established 1870"

See your WILLSON Distributor or write us direct.

WILLSON PRODUCTS, Inc., 233 Washington St., Reading, Pennsylvania

pigment locked in a new type of insoluble vehicle. Retention of the nondrying vehicle keeps the compound soft, creating a permanent seal but allowing units to be easily disassembled after long periods of time even under high temperature conditions.

Check No. 25 on Reply Card for more Details

Chemical Cartridge Respirators

Known as the 800 series, a new line of chemical cartridge respirators are available from Willson Products Inc., Reading, Pa . It includes styles for protection against low concentrations of many common industrial gases and vapors, metal fumes, mists and dusts. With a newly designed facepiece, the respirators are made in three cartridge sizes, 60, 85 and 100 cc.

Check No. 26 on Reply Card for more Details

Regulating Valve

Hydraulic Equipment Co., Cleveland 17, O., has developed an automatic plunger type oil hydraulic flow regulating valve. Known as series 450, it is designed to eliminate hydraulic voids in cylinder operation where, in lowering heavy loads, the operating cylinder tends to lower faster than pump can supply oil to it or in systems where linkage is such that overcenter operation is involved.

Check No. 27 on Reply Card for more Details

Wheel Dresser

A wheel dresser than can be mounted on a magnetic chuck to accurately dress any radius, concave or convex with angles tanget to radius is announced by Last Word Sales Co., Detroit 34, Mich. Angle stops are incorporated for accurate control of relationship of radius and tangent.

Check No. 28 on Reply Card for more Details

Composition Washer

Weath-R-seal, a combination metal and neoprene composition washer, is offered by Fabricated Products, West Newton, Pa. It is for applications where a metal and a compressible washer are used separately for sealing, surface protection or vibration absorption. Washer is made in sizes from $\frac{3}{8}$ to 3 inches OD.

Check No. 29 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Helpful Literature

73. Aluminum Fabricating

Reynolds Metals Co.—"Pounds of Parts Instead of Pounds of Metal" is title of illustrated booklet which tells story of Parts Division which offers aluminum fabricating service to manufacturers. It tells how to avoid hidden costs in parts manufacture.

74. Meehanite Castings

Meehanite Metal Corp.—"25 Years of Proof in Service" is 4-page booklet commemorating the 25th anniversary of company and provides several case histories of unusual applications of Meehanite castings in various industries.

75. Crane Cab Air Conditioners

Lintern Corp.—Design features of crane cab Aire-Rectifiers, plus temperature tables and recommended sizes of these conditioning units for all ambient temperatures found in mill and foundry, are presented in 16-page bulletin No. 5109AC. Three models are covered.

76. Vapor Degreasers

Phillips Mfg. Co.—Line of vapor degreasers along with features, capacities and uses of specific units is described in illustrated 10-page pamphlet. Photos show various industrial applications for both tank-type and conveyorized units.

77. Die Presses

E. W. Bliss Co.—28-page "Owner's Manual for Bliss S-2 Presses" combines service sheets A-109 and A-108 into manual containing complete installing, operating and maintenance instructions for straight-side double-crank presses and type K single disk friction clutch.

78. Boiler Blow-Off Valves

Yarnall-Waring Co.—24-page illustrated bulletin B-425 (1951) gives information on Yarway blow-off valves for pressures up to 400 psi, plus additional data on high pressure blow-off valves. Design details and specifications are provided and typical installations shown.

79. Tool Grinder & Lapper

Carl Hirschmann Co.—Descriptive and operating details on Swiss-made hard metal tool grinding and lapping machines are given in illustrated specification sheets. Machines will lap and grind carbide tools for any type Swiss screw machine.

80. Precision Drill Press

Hamilton Tool Co.—Details of Super Sensitive drilling machine for production drilling of small holes are presented in 4-page illustrated bulletin AM-47. Drilling capacity is 0.004 to 0.250-in. in all drillable materials, and spindle speeds with various motors and drives are 788 to 9500 rpm.

81. Vibration Mounting Felt

American Felt Co.—"How to Reduce Vibration" is title of 16-page illustrated booklet describing Vibra-Mount felt, a special type designed as a cushioning material for mounting vibrating machinery or precision instruments. Booklet tells where felt is being used, how to select proper mount and how to install it. Felt effects up to 85 per cent reduction in transmitted vibration.

82. Grab Buckets

McKiernan-Terry Corp.—Large capacity type RD Mead-Morrison grab buckets for coal and ore are dealt with in 6-page illustrated folder RD-1. Also described is type RDT clean-up ore grab which is available in sizes for floor areas up to 24 x 10 ft.

83. Sheet Steel Piling

L. B. Foster Co.—Advantages of renting steel sheet piling plus engineering data on piling interlocking sections and connections, pile hammers and extractors are offered in 8-page folder F-160. Pictures show piling used on six large projects.

84. Direct Fired Heaters

Airtherm Mfg. Co.—16-page illustrated catalog 802A presents installation information, construction details, capacity tables, dimensions and typical specifications for gas or oil-fired direct fired heaters. Floor, horizontal and inverted suspension models are offered.

85. Variable Speed Pulley

Gerbing Mfg. Corp.—28-page illustrated catalog No. 651 contains engineering information, data on drive selection and typical installations for Roto-Cone variable speed motor pulley. Made in ratings from ¼ to 15 hp, pulley is offered with adjustable motor base which has handwheel and screw to adjust speed.

86. Milling Tools

DoALL Co.—12-page illustrated catalog No. 51-806 presents information on various models of milling cutters, slitting saws, end mills, shell end mills, keyseat cutters and T-slot cutters. Regrinding tips, how to increase tool life by use of soluble oils and speed and feed data are included.

FOR MORE INFORMATION USE ONE OF THESE CARDS . .

FIRST CLASS
PERMIT No. 36
(Sec. 34.9 P.L. & R.)
Cleveland, Ohio

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

4c POSTAGE WILL BE PAID BY—

STEEL
Penton Building
CLEVELAND 13, OHIO

Readers' Service Dept.

STEEL Numbers				
1	21	41	61	81
2	22	42	62	82
3	23	43	63	83
4	24	44	64	84
5	25	45	65	85
6	26	46	66	86
7	27	47	67	87
8	28	48	68	88
9	29	49	69	89
10	30	50	70	90
11	31	51	71	91
12	32	52	72	92
13	33	53	73	93
14	34	54	74	94
15	35	55	75	95
16	36	56	76	96
17	37	57	77	97
18	38	58	78	98
19	39	59	79	99
20	40	60	80	100

STEEL 10-15-51
Penton Building, Cleveland 13, Ohio

Please send ☐ Literature ☐ Price Information ☐ Nearest source of supply on the items circled at the left.

NAME _____ TITLE _____

COMPANY _____

PRODUCTS MANUFACTURED _____

ADDRESS _____

CITY and ZONE _____ STATE _____

This card MUST be completely filled in. Please TYPE or PRINT

87. Hydraulic Valves

Rivett Lathe & Grinder, Inc.—Working drawings, specifications and application data are given on 138 models of hydraulic valves for working pressures up to 1500 psi in 28-page illustrated catalog No. 203. Available types include hand, foot, cam, solenoid, oil pressure and air pressure operated valves with standard, spring return, spring centered and ball detent actions and in seven sizes from ¼ to 1½ in.

88. Screw Driving Equipment

Parker-Kalon Corp.—Described and illustrated in 4-page brochure No. 401 are portable and suspended electric and air tools, and single and double spindle automatic hopper-fed screw inserting machines for driving self-tapping screws. Proper bits and sockets are discussed.

89. Parts Handling Trucks

Lloyd Engineering Co.—Safe transit of parts in production line is assured with peg rack trucks which are described in illustrated bulletin. These welded steel trucks have 90 pegs of ⅜-in. square steel, 7 in. long, covered with fiber and cushioned at the bases.

90. Driveshafts

Morse Chain Co.—Complete data and specifications, plus a working table of maximum recommended lengths and speeds covering Morflex radial driveshafts with spline-jointed tubular shafts and universal driveshafts with one-piece and spline-jointed tubular shafts, are offered in bulletin F 41-51.

91. Recording Oscillograph

Consolidated Engineering Corp.—16-page illustrated bulletin 1500B describes model 5-114 recording oscillograph, a multichannel instrument for analysis and measurement of strain, vibration, pressure, acceleration and other phenomena. Instrument records photographically up to 18 phenomena at one time.

92. Carton Marking Equipment

Industrial Marking Equipment Co.—20-page illustrated bulletin "Marking Equipment Engineered for Industry" gives information on conveyor line marker, multiwall bag printer, corrugated and fiber shipping case printer and other marking equipment for bags, boxes, cartons and products. Type samples are shown.

93. Reinforced Laminate

Richardson Co. — Illustrated data sheet T-815 contains information on Insurok T-815 reinforced laminate for gears and mechanical parts. Material affords uniform strength in all directions plus smooth finish and good electrical properties.

94. Frequency Converters

General Electric Co.—4-page illustrated booklet GEA-5637 covers Tri-Clad three-phase induction frequency converters offered in ratings from ¾ to 100 kw. Fundamenta.s, operation and construction features of high frequency power supply apparatus are described.

95. Synthetic Lubricants

Union Carbide & Carbon Corp., Carbide and Carbon Chemicals Div. —How to use nonsludging UCON synthetic lubricants in kiln car wheels, oven-car wheels, oven-chains and drives, glass machinery, as well as on heavy-loaded gears, bearings and speed reducers operating at high temperature is shown in 8-page booklet F-7404.

96. Industrial Polishing

Schaffner Mfg. Co.—Company has published 12-page booklet No. 51 describing modern techniques of industrial polishing and buffing as related to various buffs, polishes and plating supplies it manufactures. Booklet also serves as catalog, listing company products.

97. X-Ray Spectrometer

Minneapolis - Honeywell Regulator Co., Brown Instruments Div.—Instrumentation data sheet 10.16-1 describes improved x-ray spectrometer, made by North American Philips Co., which features a wide range Geiger-Counter Goniometer and Brown ElectroniK recorder.

98. Die Lubricator

C. A. Norgren Co.—How a manufactor of wire forming machines increased die life, minimized wire flaking and reduced air cylinder maintenance on machine is explained in 2-page illustrated data sheet No. 106.

99. Press Room Equipment

U. S. Tool Co.—Slide and roll feeds, straighteners, stock reels, coil cradles, oiler-wipers, scrap choppers and multi-stop machines are among the automatic press room equipment covered in illustrated 17-page bulletin No. 80. Specifications are tabulated on each unit.

100. Dwarf Hardness Tester

R. Y. Ferner Co.—Illustrated booklet offers design information, specifications and instructions for use of dwarf Brinell precision hardness tester. Type M 60/750 machine is available with variety of accessories which are listed along with price data.

FOR MORE INFORMATION USE ONE OF THESE CARDS . .

STEEL Numbers

1	21	41	61	81
2	22	42	62	82
3	23	43	63	83
4	24	44	64	84
5	25	45	65	85
6	26	46	66	86
7	27	47	67	87
8	28	48	68	88
9	29	49	69	89
10	30	50	70	90
11	31	51	71	91
12	32	52	72	92
13	33	53	73	93
14	34	54	74	94
15	35	55	75	95
16	36	56	76	96
17	37	57	77	97
18	38	58	78	98
19	39	59	79	99
20	40	60	80	100

STEEL 10-15-51

Penton Building, Cleveland 13, Ohio

Please send ☐ Literature ☐ Price Information ☐ Nearest source of supply on the items circled at the left.

NAME TITLE

COMPANY

PRODUCTS MANUFACTURED

ADDRESS

CITY and ZONE STATE

This card MUST be completely filled in. Please TYPE or PRINT

FIRST CLASS PERMIT No. 36 (Sec. 34.9 P.L.&R.) Cleveland, Ohio

BUSINESS REPLY CARD

No Postage Stamp Necessary if Mailed in the United States

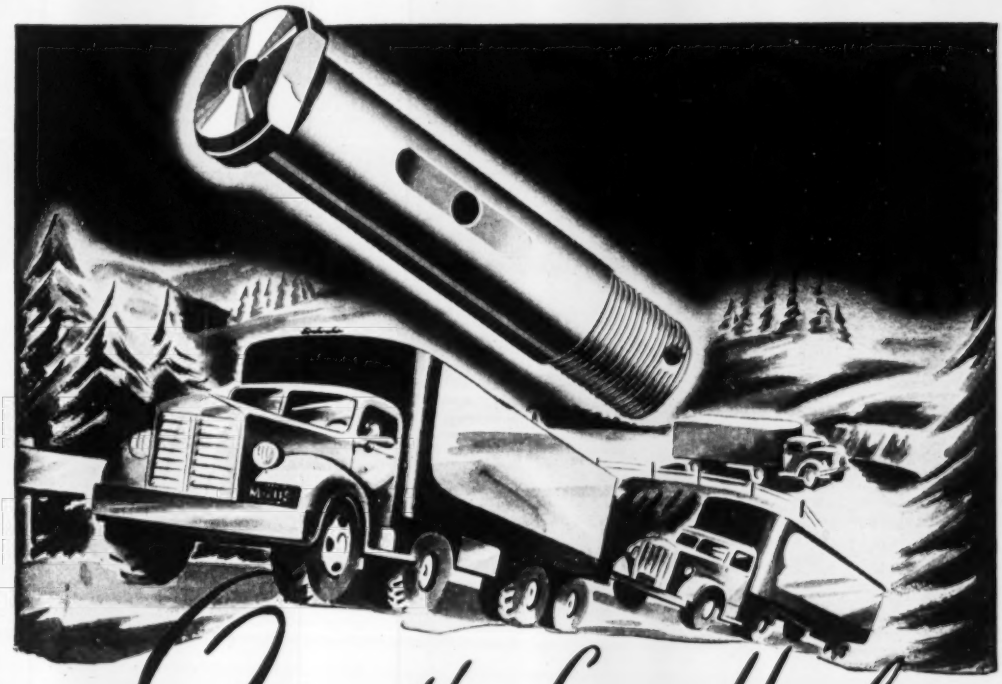
4c POSTAGE WILL BE PAID BY—

STEEL

Penton Building

CLEVELAND 13, OHIO

Readers' Service Dept.



Over the Long Haul

The FERRY CAP Spring Bolt *Proves its Mettle*

This Ferry Cap Spring Bolt is one of hundreds of different designs which we make for leading truck manufacturers. We manufacture them to various head shapes, with oil holes and grooves of different kinds, and flats accurately milled. Precision is a principle at Ferry Cap.

The bolt has maximum ground surface-wearing qualities. It is case hardened to proper depth, achieving a hard surface with a relatively soft core, assuring both long wear and high fatigue strength. The thread end is annealed to make it tough, but not brittle—more than equal to the required thread strength.

The body is ground to close tolerance, oil holes expertly drilled, and flats milled to a smooth, true surface to allow free flow of lubricants. The cotter holes, accurately drilled, are free from burrs. Result—the bolt fits perfectly.

It is a spring bolt of which any truck manufacturer can well be proud—a clean cut, precision-made, long-wearing, tough, dependable product.

The FERRY CAP & SET SCREW Co.

2159 SCRANTON ROAD • • • • • CLEVELAND 13, OHIO

CAP AND SET SCREWS • CONNECTING ROD BOLTS • MAIN BEARING BOLTS • SPRING BOLTS AND SHACKLE BOLTS • HARDENED AND GROUND BOLTS • SPECIAL ALLOY STEEL SCREWS • VALVE TAPPET ADJUSTING SCREWS • AIRCRAFT ENGINE STUDS • ALLOY STEEL AND COMMERCIAL STUDS • FERRY PATENTED ACORN NUTS

for

dependable hardenability in low alloy steels

USE *Grainal* ALLOYS

For electric furnace steels as well as for open hearth steels, Grainal alloys are used successfully to increase hardenability.

An appreciably larger quantity of Grainal is usually required in electric furnace practice because of the higher nitrogen content characteristic of steels produced by this method. The conversion of the nitrogen content of the steel to an ineffective compound, as is done by some of the components of Grainal, permits a minimum amount of boron to produce the desired effects.

Grainal alloys are metallurgically balanced so that the larger additions required by electric furnace steels can be made safely without exceeding the boron limit for hot shortness.

VANADIUM CORPORATION OF AMERICA

420 LEXINGTON AVENUE, NEW YORK 17, N. Y. • DETROIT • CHICAGO • CLEVELAND • PITTSBURGH

MAKERS OF ALLOYS VANCORAM CHEMICALS AND METALS

The Market Outlook

FINISHED steel order cancellations due to duplications or tonnage placed in excess of final NPA allotments for fourth quarter are developing slowly. Steelmakers report volume canceled to date negligible despite the government ruling that third quarter carryover not shipped by Oct. 7 be charged by consumers against their fourth quarter allotments. It still is too early for final conclusions as to the efficacy of this latest government move. In fact, trade authorities believe impact of the regulation will not be felt much before November. However, while experience to date is not too reassuring, it is evident steel control authorities are banking heavily on this policy as regards carryover tonnage to make way for a large number of fourth quarter CMP tickets still unplaced.

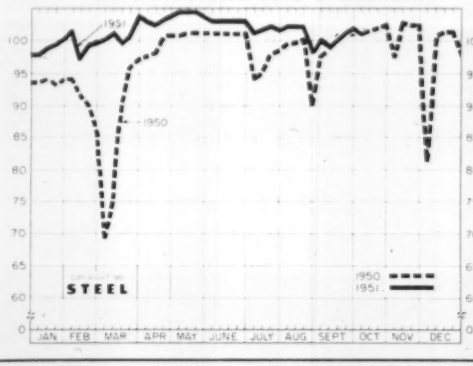
BOOKINGS— Steelmakers generally are accepting no forward orders for shipment beyond first quarter except in cases of high-rated military requirements. One exception in this regard appears to be cold-finished bars. Last week signs indicated cold-finishers were opening books for second quarter; at least some of them were accepting April shipment business. Expectations are they will book additional tonnage for the period just as soon as they definitely know what to expect in the way of final NPA allocations and special directives.

DEMAND— From some directions demand pressure does not seem quite as strong as it was awhile back. Overall requirements continue to tax producing capacity, but needs of certain manufacturers have definitely eased off. This is true principally in consumer durable lines, such as stoves and sanitaryware, where cutbacks in supplies and heavy stocks of finished goods have forced production curtailments. On the other hand, some consumer goods lines, television for example, are showing signs of quickening activity as manufacturers prepare for the holiday trade. For the most part any slack that appears in demand is quickly taken up on defense account.

PRODUCTION— Steel ingot output continues at a rate in excess of 2 million tons weekly. Last week the national ingot rate rose ½ point to 101.5 per cent of capacity, increases at several points more than offsetting declines at others. However, the long campaign of capacity operations is taking toll and steelmakers are meeting growing difficulty maintaining facilities at peak efficiency. Further, sporadic labor trouble and slowdowns at various producing centers are hampering operations seriously. Nevertheless, barring severe scrap shortage this winter the steelmakers expect to keep facilities engaged close to the current over-capacity rate indefinitely.

PRICES— Upward pressure on finished steel and related product price structures is in evidence. Except for isolated revisions, such as last summer on stainless and tool steels, prices have held at the January freeze levels. However, costs have risen sharply since and are still rising. Right now the steelmakers are facing threat of another wage increase. Trade authorities claim another increase cannot possibly be absorbed and must be offset by a price increase, if granted. Steelworkers are expected to open negotiations with the industry for a new wage agreement around Dec. 1, and indications are they will ask for considerably more than 4 cents per hour. Currently, the steel mills are in a quandary as to how far they can go in marking up their prices on galvanized products, such as sheets, pipe and wire, to compensate for recent advances in zinc. Heretofore, such passing along of costs has been more or less automatic as standard practice. However, government price control puts the matter of pricing in a different light and most producers are inclined to feel their way in effecting changes. Last week, several producers announced increases of $1 to $4 per ton on galvanized pipe. There is some question whether the new discounts named are firm, however, since it appears definite policy still remains to be formulated.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Oct. 13	Change	Same Week 1950	Same Week 1949
Pittsburgh	99.5	0*	103	3.5
Chicago	107	— 0.5*	103	5
Mid-Atlantic	99	— 1	99	8.5
Youngstown	94	0	106	6
Wheeling	101	+ 4.5	98	59.5
Cleveland	100.5	— 1.5*	96	0
Buffalo	104	0	104	6
Birmingham	104	0	100	6
New England	95	+ 5	82	52
Cincinnati	101	+ 1	103	46
St. Louis	95	+ 6.5	94	89.5
Detroit	101.5	— 2	104	10
Western	103	0	103	21
Estimated national rate	101.5	+ 0.5	101.5	8

Based on weekly steelmaking capacity of 1,969,634 tons for 1951; 1,928,721 tons for second half, 1950; 1,986,268 tons for first half, 1950; 1,843,516 tons for 1949.

*Change from revised rate for preceding week.

Composite Market Averages

FINISHED STEEL INDEX, Weighted:

	Oct. 11 1951	Week Ago	Month Ago	Year Ago	5 Yrs Ago
Index (1935-39 av. = 100)	171.92	171.92	171.92	157.29	112.04
Index in cents per lb.	4.657	4.657	4.657	4.261	3.035

ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$190.32	$190.32	$190.32	$94.64	$64.15
No. 2 Fdry. Pig Iron, GT	52.54	52.54	52.54	48.97	28.17
Basic Pig Iron, GT	52.16	52.16	52.16	47.72	27.50
Malleable Pig Iron, GT	53.27	53.27	53.27	49.20	28.79
Steelmaking Scrap, GT	44.00	44.00	44.00	41.00	19.17

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 respresentative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Oct. 11 1951	Week Ago	Month Ago	Year Ago	5 Yrs Ago
Bars, H.R., Pittsburgh	3.70	3.70	3.70	3.45	2.50
Bars, H.R., Chicago	3.70	3.70	3.70	3.45	2.50
Bars, H.R., del. Philadelphia	4.223	4.223	4.223	3.93	2.86
Bars, C.F., Pittsburgh	4.35	4.35	4.35	4.15	3.10
Shapes, Std., Pittsburgh	3.65	3.65	3.65	3.40	2.35
Shapes, Std., Chicago	3.65	3.65	3.65	3.40	2.35
Shapes, del. Philadelphia	3.918	3.918	3.918	3.46	2.48
Plates, Pittsburgh	3.70	3.70	3.70	3.50	2.50
Plates, Chicago	3.70	3.70	3.70	3.50	2.50
Plates, Coatesville, Pa.	4.15	4.15	4.15	3.90	2.50
Plates, Sparrows Point, Md.	3.70	3.70	3.70	3.50	2.50
Plates, Claymont, Del.	4.15	4.15	4.15	3.90	2.50
Sheets, H.R., Pittsburgh	3.60-75	3.60-75	3.60-75	3.35	2.425
Sheets, H.R., Chicago	3.60	3.60	3.60	3.35	2.425
Sheets, C.R., Pittsburgh	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Chicago	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Detroit	4.55	4.55	4.55	4.30	3.375
Sheets, Galv., Pittsburgh	4.80	4.80	4.80	4.40	4.05
Strip, H.R., Pittsburgh	3.75-4.00	3.75-4.00	3.75-4.00	3.50	2.35
Strip, H.R., Chicago	3.50	3.50	3.50	3.25	2.35
Strip, C.R., Pittsburgh	4.65-5.35	4.65-5.35	4.65-5.35	4.15-50	3.425
Strip, C.R., Chicago	4.90	4.90	4.90	4.30	3.15
Strip, C.R., Detroit	4.85-5.60	4.85-5.60	4.85-5.60	4.35-95	3.15
Wire, Basic, Pittsburgh	4.85-5.10	4.85-5.10	4.85-5.10	4.50-4.75	3.05
Nails, Wire, Pittsburgh	5.90-6.20	5.90-6.20	5.90-6.20	5.30-5.90	3.75
Tin plate, box, Pittsburgh	$8.70	$8.70	$8.70	$7.50	$5.25

SEMIFINISHED

Billets, forging, Pitts. (NT)	$66.00	$66.00	$66.00	$63.00	$47.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$", Pitts.	4.10-30	4.10-30	4.10-30	3.85	2.30

PIG IRON, Gross Ton

Bessemer, Pitts.	$53.00	$53.00	$53.00	$47-$50	$29.00
Basic Valley	52.00	52.00	52.00	46-49	28.00
Basic, del. Phila.	56.61	56.61	56.61	50.39	29.93
No. 2 Fdry, Pitts.	52.50	52.50	52.50	49.50	28.50
No. 2 Fdry, Chicago	52.50	52.50	52.50	49.50	28.50
No. 2 Fdry, Valley	52.50	52.50	52.50	49.50	28.50
No. 2 Fdry, Del. Phila.	57.11	57.11	57.11	50.89	30.43
No. 2 Fdry, Birm.	48.88	48.88	48.88	45.88	24.88
No. 2 Fdry (Birm.) del. Cin.	55.49	55.49	55.49	52.58	28.94
Malleable Valley	52.50	52.50	52.50	49.50	28.50
Malleable, Chicago	52.50	52.50	52.50	46.50-49.50	28.50
Charcoal, Lyles, Tenn.	66.00	66.00	66.00	62.00	33.00
Ferromanganese, Etna, Pa.	188.00	188.00	188.00	175.00	140.00*

* Delivered, Pittsburgh.

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt, Pitts.	$45.00	$45.00	$45.00	$44.00	$20.00
No. 1 Heavy Melt, E. Pa.	43.50	43.50	43.50	39.00	18.75
No. 1 Heavy Melt, Chicago	43.50	43.50	43.50	40.00	18.75
No. 1 Heavy Melt, Valley	45.00	45.00	45.00	43.75	20.00
No. 1 Heavy Melt, Cleve.	44.00	44.00	44.00	43.25	19.50
No. 1 Heavy Melt, Buffalo	44.00	44.00	44.00	41.50	19.25
Rails, Rerolling, Chicago	52.50	52.50	52.50	61.00	22.25
No. 1 Cast, Chicago	49.00*	49.00*	49.00*	50.50	20.00

* F.o.b. shipping point.

COKE, Net Ton

Beehive, Furn. Connlsvl.	$14.75	$14.75	$14.75	$14.25	$8.75
Beehive, Fdry., Connlsvl.	17.50	17.50	17.50	16.50	9.50
Oven Fdry., Chicago	23.00	23.00	23.00	21.00	14.35

NONFERROUS METALS

Copper, del. Conn.	24.50	24.50	24.50	24.50	14.375
Zinc, E. St. Louis	19.50	19.50	17.50	17.50	8.25
Lead, St. Louis	18.80	18.80	16.80	15.80	8.10
Tin, New York	103.00	103.00	103.00	112.00	52.00
Aluminum, del.	19.00	19.00	19.00	19.00	15.00
Antimony, Laredo, Tex.	42.00	42.00	42.00	32.00	14.50
Nickel, refinery, duty paid	56.50	56.50	56.50	48.00	35.00

PIG IRON

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax. Key to producing companies published on second following page.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem,Pa. B2	$54.00	$54.50	$55.00	$55.50
Brooklyn,N.Y., del.	....	59.18	59.68	....
Newark,del.	56.87	57.37	57.87	58.37
Philadelphia, del.	56.61	57.11	57.61	58.11
Birmingham District				
AlabamaCity,Ala. R2	48.38	48.88	....	....
Birmingham R2	48.38	48.88	....	....
Birmingham S8	48.38	48.88	....	....
Woodward,Ala. W15	48.38	48.88	....	....
Cincinnati, del.	....	55.49	....	....
Buffalo District				
Buffalo R2	52.00	52.50	53.00	....
Buffalo H1	52.00	52.50	53.00	....
Tonawanda,N.Y. W12	52.00	52.50	53.00	....
No.Tonawanda,N.Y. T9	....	52.50	53.00	....
Boston, del.	62.11	62.61	63.11	....
Rochester,N.Y., del.	54.88†	55.38†	55.88†	....
Syracuse,N.Y., del.	55.91†	56.41†	56.91†	....
Chicago District				
Chicago I-3	52.00	52.50	52.50	53.00
Gary,Ind. U5	52.00	....	52.50	....
IndianaHarbor,Ind. I-2	52.00	....	52.50	....
So.Chicago,Ill. W14	52.00	52.50	52.50	....
So.Chicago,Ill. Y1	52.00	52.50	52.50	....
So.Chicago,Ill. U3	52.00	....	52.50	53.00
Milwaukee, del.	54.06	54.56	54.56	55.06
Muskegon,Mich., del.	....	58.47	58.47	....
Cleveland District				
Cleveland A7	52.00	52.50	52.50	53.00
Cleveland R2	52.00	52.50	52.50	....
Akron,O., del. from Cleve.	54.61	55.11	55.11	55.61
Lorain,O. N3	52.00	....	....	53.00
Duluth I-3	....	....	52.50	....
Erie,Pa. I-3	52.00	52.50	52.50	53.00
Everett,Mass. E1	....	57.00	57.50	....
Fontana,Calif. K1	58.00	58.50	....	....
Geneva,Utah G1	52.00	52.50	....	....
Seattle,Tacoma,Wash., del.	....	60.66	....	....
Portland,Oreg., del.	....	60.66	....	....
LosAngeles,SanFrancisco, del.	60.16	60.66	....	....
GraniteCity,Ill. G4	53.90	54.40	54.90	....
St.Louis, del. (inc. tax)	54.66	55.16	55.66	....
Ironton,Utah C11	52.00	52.50	....	....
LoneStar,Tex. L6	48.00	*48.50	48.50	....
Minnequa,Colo. C10	54.00	55.00	55.00	....
Pittsburgh District				
Nevillelsland,Pa. P6	....	52.50	52.50	53.00
Pitts., N.&S. sides, Ambridge, Aliquippa, del.	....	53.80	53.80	54.30
McKeesRocks, del.	....	53.54	53.54	54.04
Lawrenceville, Homestead, McKeesport, Monaca, del.	....	54.07	54.07	54.57
Verona, del.	....	54.57	54.57	55.07
Brackenridge, del.	....	54.82	54.82	55.32
Bessemer,Pa. U5	52.00	....	52.50	53.00
Clairton,Rankin,So.Duquesne,Pa. U5	52.00	....	....	....
McKeesport,Pa. N3	52.00	....	....	53.00
Monessen,Pa. P7	54.00	....	....	....
Sharpsville,Pa. S6	....	....	52.50	53.00
Steelton,Pa. B2	54.00	54.50	55.00	55.50
Swedeland,Pa. A3	56.00	56.50	57.00	57.50
Toledo,O. I-3	52.00	52.50	52.50	53.00
Cincinnati, del.	57.47	57.97	....	....
Troy,N.Y. R2	54.00	54.50	55.00	55.50
Youngstown District				
Hubbard,O. Y1	52.00	52.50	52.50	....
Youngstown Y1	52.00	52.50	52.50	....
Youngstown U5	52.00	....	....	53.00
Mansfield,O., del.	56.65	57.15	57.15	57.65

* Low phos, southern grade. † Preliminary.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY IRON, Gross Ton

(Base 6.00 16.50% silicon; add $1.50 for each 0.5% Si)

Jackson,O. G2, J1	$62.50
Buffalo H1	63.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for each 0.045% max. P)

Niagara Falls,N.Y. P15	$88.00
Keokuk,Iowa, Openhearth & Fdry, frt. allowed K2	92.50
Keokuk, OH & Fdry., 12½ lb piglets, 16% Si, frt. allowed K2	95.50
Wenatchee,Wash., O.H. & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles,Tenn. T3	$66.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$57.00
Steelton,Pa. B2	60.00
Philadelphia delivered	63.37
Troy,N.Y. R2	60.00

(Material in this department is protected by copyright and its use in any form without permission is prohibited)

Semifinished and Finished Steel Products

Mill prices quoted under GCPR as reported to STEEL, Oct. 11, 1951, cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)
Fontana,Calif. K1 ....$79.00
Munhall,Pa. U5 ....82.00

INGOTS, Alloy (NT)
Detroit R7 ....$54.00
Fontana,Calif. K1 ....80.00
Houston,Tex. S5 ....62.00
Midland,Pa. C18 ....54.00
Munhall,Pa. U5 ....54.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$56.00
Clairton,Pa. U5 ....56.00
Ensley,Ala. T2 ....56.00
Fairfield,Ala. T2 ....56.00
Fontana,Calif. K1 ....75.00
Gary,Ind. U5 ....56.00
Johnstown,Pa. B2 ....56.00
Lackawanna,N.Y., B2 ..56.00
Munhall,Pa. U5 ....56.00
So.Chicago,Ill. U5 ....56.00
So.Duquesne,Pa. U5 ....56.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$66.00
Buffalo R2 ....66.00
Canton,O. R2 ....66.00
Clairton,Pa. U5 ....66.00
Cleveland R2 ....66.00
Conshohocken,Pa. A3 ..73.00
Detroit R7 ....69.00
Ensley,Ala. T2 ....66.00
Fairfield,Ala. T2 ....66.00
Fontana,Calif. K1 ....85.00
Gary,Ind. U5 ....66.00
Geneva,Utah G1 ....66.00
Houston,Tex. S5 ....74.00
Johnstown,Pa. B2 ....66.00
Lackawanna,N.Y. B2 ..66.00
LosAngeles B3 ....85.00
Munhall,Pa. U5 ....66.00
Seattle B3 ....85.00
So.Chicago R2,U5,W14 ..66.00
So.Duquesne,Pa. U5 ..66.00
So.SanFrancisco B3 ..85.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$76.00
Buffalo R2 ....70.00
Canton,O. R2 ....70.00
Canton,O.(29) T7 ....66.00
Conshohocken,Pa. A3 ..77.00
Detroit R7 ....73.00
Fontana,Calif. K1 ....90.00
Gary,Ind. U5 ....70.00
Houston,Tex. S5 ....78.00
Ind.Harbor,Ind. Y1 ....70.00
Johnstown,Pa. B2 ....70.00
Lackawanna,N.Y. B2 ..70.00
LosAngeles B3 ....90.00
Massillon,O. R2 ....70.00
Midland,Pa. C18 ....70.00
Munhall,Pa. U5 ....70.00
So.Chicago R2,U5,W14 ..70.00
So.Duquesne,Pa. U5 ..70.00
Struthers,O. Y1 ....70.00
Warren,O. C17 ....70.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 ....$82.00
Cleveland R2 ....82.00
Fontana,Calif. K1 ....103.00
Gary,Ind. U5 ....82.00
Massillon,O. R2 ....82.00
So.Chicago,Ill. R2 ....82.00
So.Duquesne,Pa. U5 ....82.00

SHEET BARS (NT)
Fontana,Calif. K1 ....$89.00

SKELP
Aliquippa,Pa. J5 ....$3.45
Munhall,Pa. U5 ....3.35
Warren,O. R2 ....3.35
Youngstown, R2, U5 ....3.35

WIRE RODS
Alton,Ill. L1 ....4.40
AlabamaCity,Ala. R2 ..4.10
Buffalo W12 ....4.10
Cleveland A7 ....4.10
Donora,Pa. A7 ....4.10
Fairfield,Ala. T2 ....4.10
Fontana,Calif. K1 ....4.90
Houston,Tex. S5 ....4.50
Johnstown,Pa. B2 ....4.10
Joliet,Ill. A7 ....4.10
LosAngeles B3 ....4.90
Minnequa,Colo. C10 ....4.35
Monessen,Pa. P7 ....4.30
No.Tonawanda,N.Y.B11 ..4.10
Pittsburg,Calif. C11 ....4.75
Portsmouth,O. P12 ....4.30
Roebling,N.J. R5 ....4.20
So.Chicago,Ill. R2 ....4.10
SparrowsPoint,Md. B2 ..4.20
Sterling,Ill.(1) N15 ....4.10
Struthers,O. Y1 ....4.10
Torrance,Calif. C11 ....4.90
Worcester,Mass. A7 ....4.40

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ....4.45
Lackawanna,N.Y. B2 ....4.45
Munhall,Pa. U5 ....4.45
So.Chicago,Ill. U5 ....4.45

STRUCTURALS
Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 ..3.60
Aliquippa,Pa. J5 ....3.65
Bessemer,Ala. T2 ....3.65
Bethlehem,Pa. B2 ....3.70
Clairton,Pa. U5 ....3.65
Fairfield,Ala. T2 ....3.65
Fontana,Calif. K1 ....4.25
Gary,Ind. U5 ....3.65
Geneva,Utah G1 ....3.65
Bessemer,Ala. T2 ....4.05
Ind.Harbor,Ind. I-2 ....3.65
Johnstown,Pa. B2 ....3.70
KansasCity,Mo. S5 ....4.25
Lackawanna,N.Y. B2 ..3.70
LosAngeles B3 ....4.25
Minnequa,Colo. C10 ....4.10
Munhall,Pa. U5 ....3.65
Niles,Calif.(22) P1 ....4.85
Phoenixville,Pa. P4 ....6.25
Portland,Oreg. O4 ....4.50
Seattle B3 ....4.30
So.Chicago,Ill. U5,W14 ..3.65
So.SanFrancisco B3 ....4.20
Torrance,Calif. C11 ....4.25
Weirton,W.Va. W6 ....3.90

Alloy Stand. Shapes
Clairton,Pa. U5 ....4.35
Fontana,Calif. K1 ....5.55
Munhall,Pa. U5 ....4.35
So.Chicago,Ill. U5 ....4.35

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 ....5.50
Bessemer,Ala. T2 ....5.50
Bethlehem,Pa.(14) B2 ..5.50
Clairton,Pa. U5 ....5.50
Fairfield,Ala. T2 ....5.50
Fontana,Calif. K1 ....6.10
Gary,Ind. U5 ....5.50
Geneva,Utah G1 ....5.50
Ind.Harbor,Ind. I-2 ....5.50
Ind.Harbor,Ind. Y1 ....6.00
Johnstown,Pa. B2 ....5.50
Lackawanna,N.Y.(14)B2 ..5.50
LosAngeles B3 ....6.05
Munhall,Pa. U5 ....5.50
Seattle B3 ....6.10
So.Chicago,Ill. U5 ....5.50
So.SanFrancisco B3 ....6.00
Struthers,O. Y1 ....6.00

Wide Flange
Bethlehem,Pa. B2 ....3.70
Clairton,Pa. U5 ....3.65
Fontana,Calif. K1 ....4.65
Lackawanna,N.Y. B2 ..3.70
Munhall,Pa. U5 ....3.65
So.Chicago,Ill. U5 ....3.65

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 ....5.50
Lackawanna,N.Y. B2 ..5.50
Munhall,Pa. U5 ....5.45
So.Chicago,Ill. U5 ....5.45

BEARING PILES
Munhall,Pa. U5 ....3.65
So.Chicago,Ill. U5 ....3.65

PLATES, High-Strength Low-Alloy
Aliquippa,Pa. J5 ....5.65
Bessemer,Ala., T2 ....5.65
Clairton,Pa. U5 ....5.65
Cleveland J5, R2 ....5.65
Conshohocken,Pa. A3 ....5.90
Fairfield,Ala. T2 ....5.65
Fontana,Calif.(30) K1 ..6.25
Gary,Ind. U5 ....5.65
Geneva,Utah G1 ....5.65
Ind.Harbor,Ind. I-2 ....5.65
Ind.Harbor,Ind. Y1 ....6.15
Johnstown,Pa. B2 ....5.65
Munhall,Pa. U5 ....5.65
Pittsburgh J5 ....5.65
Seattle B3 ....6.55
Sharon,Pa. S3 ....5.70
So.Chicago,Ill. U5 ....5.65
SparrowsPoint,Md. B2 ..5.65
Warren,O. R2 ....5.65
Youngstown Y1 ....6.15

PLATES, Open-Hearth Alloy
Claymont,Del. C22 ....4.85
Coatesville,Pa. L7 ....5.25
Conshohocken,Pa. A3 ..5.90
Fontana,Calif. K1 ....5.70
Gary,Ind. U5 ....4.75
Johnstown,Pa. B2 ....4.75
Munhall,Pa. U5 ....4.75
So.Chicago,Ill. U5 ....4.75
SparrowsPoint,Md. B2 ..4.75

FLOOR PLATES
Cleveland J5 ....4.75
Conshohocken,Pa. A3 ....4.75
Harrisburg,Pa. C5 ....5.95
Ind.Harbor,Ind. I-2 ....4.75
Munhall,Pa. U5 ....4.75
So.Chicago,Ill. U5 ....4.75

PLATES, Ingot Iron
Ashland,c.l.(15) A10 ..3.95
Ashland,l.c.l(15) A10 ....4.45
Cleveland,c.l. R2 ....4.30
Warren,O.c.l. R2 ....4.30

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..3.70
Aliquippa,Pa. J5 ....3.70
Ashland,Ky. (15)o A10 ..3.70
Bessemer,Ala. T2 ....3.70
Clairton,Pa. U5 ....3.70
Claymont,Del. C22 ....4.15
Cleveland J5, R2 ....3.70
Coatesville,Pa. L7 ....4.15
Conshohocken,Pa. A3 ....4.15
Fairfield,Ala. T2 ....3.70
Fontana,Calif.(30) K1 ..4.30
Gary,Ind. U5 ....3.70
GraniteCity,Ill. G4 ....4.40
Geneva,Utah, G1 ....3.70
Harrisburg,Pa. C5 ....6.75
Houston,Tex. S5 ....4.10
Ind.Harbor,Ind. I-2, Y1 ..3.70
Johnstown,Pa. B2 ....3.70
Lackawanna,N.Y. B2 ..3.70
Minnequa,Colo. C10 ....4.50
Munhall,Pa. U5 ....3.70
Pittsburgh J5 ....3.70
Seattle B3 ....4.60
Sharon,Pa. S3 ....3.95
So.Chicago,Ill. U5, W14 ..3.70
SparrowsPoint,Md. B2 ..3.70
Steubenville,O. W10 ....3.70
Warren,O. R2 ....3.70
Weirton,W.Va. W6 ....4.00
Youngstown R2, U5, Y1 ..3.70

PLATES, Carbon A.R.
Fontana,Calif. K1 ....5.45
Geneva, Utah G1 ....4.85

PLATES Wrought Iron
Economy,Pa. B14 ....8.60

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ..3.70
Aliquippa,Pa. J5 ....3.70
Alton,Ill. L1 ....4.15
Atlanta,Ga. A11 ....4.25
Bessemer,Ala. T2 ....3.70
Buffalo R2 ....3.70
Canton,O. R2 ....3.70
Clairton,Pa. U5 ....3.70
Cleveland R2 ....3.70
Detroit R7 ....3.85
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 ....3.70
Fontana,Calif. K1 ....4.40
Gary,Ind. U5 ....3.70
Houston,Tex. S5 ....4.10
Ind.Harbor,Ind. I-2, Y1 ..3.70
Johnstown,Pa. B2 ....3.70
KansasCity, Mo. S5 ....4.30
Lackawanna,N.Y. B2 ..3.70
LosAngeles B3 ....4.40
Milton,Pa. B6 ....4.20
Minnequa,Colo. C10 ....4.15
Niles,Calif. P1 ....5.03
N.Tonawanda,N.Y. B11 ..3.70
Pittsburg,Calif. C11 ....4.40
Portsmouth,O. 3.70
Portland,Oreg. O4 ....4.65
Seattle B3, N14 ....4.45
So.Chicago R2,U5,W14 ..3.70
So.Duquesne,Pa. U5 ....3.70
So.SanFran.,Cal. B3 ....4.45
Struthers,O. Y1 ....3.70
Torrance,Calif. C11 ....4.40
Weirton,W.Va. W6 ....3.85
Youngstown R2, U5 ....3.70

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 ....3.70
Atlanta A11 ....4.25
Johnstown,Pa. B2 ....3.70
Lackawanna,N.Y. B2 ..3.70
Niles,Calif. P1 ....5.05
Portland,Oreg. O4 ....4.65
SanFrancisco S7 ....4.85

BAR SIZE ANGLES; H.R CARBON
Bethlehem,Pa. B2 ....3.90

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ....4.30
Buffalo R2 ....4.30
Canton,O. R2 ....4.30
Canton,O.(29) T7 ....3.95
Clairton,Pa. U5 ....4.30
Detroit R7 ....4.45
Ecorse,Mich. G5 ....4.65
Fontana,Calif. K1 ....5.35
Gary,Ind. U5 ....4.30
Houston,Tex. S5 ....4.70
Ind.Harbor,Ind. I-2, Y1 ..4.30
Johnstown,Pa. B2 ....4.30
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ..4.30
LosAngeles B3 ....5.35
Massillon,O. R2 ....4.30
Midland,Pa. C18 ....4.30
So.Chicago R2,U5,W14 ..4.30
So.Duquesne,Pa. U5 ....4.30
Struthers,O. Y1 ....4.30
Warren,O. C17 ....4.30
Youngstown U5 ....4.30

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 ....4.55
Gary,Ind. U5 ....4.55
Youngstown U5 ....4.55

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 ....5.55
Bessemer,Ala. T2 ....5.55
Bethlehem,Pa. B2 ....5.55
Clairton,Pa. U5 ....5.55
Cleveland R2 ....5.55
Fairfield,Ala. T2 ....5.55
Fontana,Calif. K1 ....6.60
Gary,Ind. U5 ....5.55
Ind.Harbor,Ind. I-2 ....5.55
IndianaHarbor,Ind. Y1 ..6.05
Johnstown,Pa. B2 ....5.55
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 ....6.25
Pittsburgh J5 ....5.55
Seattle B3 ....6.30
So.Duquesne,Pa. U5 ....5.55
So.SanFrancisco B3 ....6.30
Struthers, O. Y1 ....6.05
Youngstown U5 ....5.55

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....4.55
BeaverFalls,Pa. M12,R2 ..4.55
Buffalo B5 ....4.60
Camden,N.J. P13 ....5.00
Carnegie,Pa. C12 ....4.55
Chicago W18 ....4.55
Cleveland A7, C20 ....4.55
Detroit P17 ....4.70
Donora,Pa. A7 ....4.55
Elyria,O. W8 ....4.55
FranklinPark,Ill. N5 ....4.55
Gary,Ind. R2 ....4.55
GreenBay, Wis. F7 ....4.55
Hammond,Ind. L2, M13 ..4.55
Hartford,Conn. R2 ....5.10
Harvey,Ill. B5 ....4.55
LosAngeles B2 ....5.00
Mansfield,Mass. B5 ....5.10
Massillon,O. R2, R8 ....4.55
Monaca, Pa. S17 ....4.55
Newark,N.J. W18 ....5.00
Plymouth,Mich. P5 ....4.80
Pittsburgh J5 ....4.55
Putnam,Conn. W18 ....5.10
Readville Mass C14 ....5.10
St. Louis,Mo. M5 ....4.95
So.Chicago,Ill. W14 ....4.55
SpringCity,Pa. (5) K3 ..5.00
Struthers,O. Y1 ....4.55
Waukegan,Ill. A7 ....4.55
Youngstown F3, Y1 ....4.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....5.40
BeaverFalls,Pa. M12 ....5.40
Bethlehem,Pa. B2 ....5.25
Buffalo B5 ....5.40
Camden,N.J. P13 ....5.80
Canton,O. R2 ....5.40
Canton,O.(29) T7 ....4.90
Carnegie,Pa. C12 ....5.40
Chicago W18 ....5.40
Cleveland A7 ....5.45
Cleveland C20 ....5.40
Detroit P17 ....5.55
Donora,Pa. A7 ....5.45
Elyria,O. W8 ....5.40
Gary,Ind. R2 ....5.40
Hammond,Ind. L2, M13 ..5.40
Hartford,Conn. R2 ....5.85
Harvey,Ill. B5 ....5.40
Lackawanna,N.Y. B2 ..5.40
Mansfield,Mass. B5 ....5.85
Massillon,O. R2,R8 ....5.40
Midland,Pa. C18 ....5.40
Monaca,Pa. S17 ....5.40
Newark,N.J. W18 ....5.75
Plymouth,Mich. P5 ....5.60
So.Chicago,Ill. R2, W14 ..5.40
Struthers,O. Y1 ....5.40
Warren,O. C17 ....5.40
Waukegan,Ill. A7 ....5.45
Worcester,Mass. A7 ....5.75
Youngstown F3, Y1 ....5.40

RAIL STEEL BARS
ChicagoHts.(3,4) C2 ....4.75
ChicagoHts.(3,4) I-2 ....4.75
Franklin,Pa.(3,4) F5 ....4.75
FortWorth,Tex.(26) T4 ..4.85
Huntingtn,W.Va.(3) W7 ..5.50
Marion,O.(3) P11 ....4.75
Moline,Ill.(3) R2 ....3.80
Tonawanda(3,4) B12 ....4.75
Williamsport(3) S19 ....5.00
Williamsport(4) S19 ....5.10

BARS, Wrought Iron
Dover,N.J.(Staybolt)U1 15.00
Dover,(Eng.Bolt) U1 ..13.50
Dover,(Wrgt.Iron) U1 12.25
Economy,Pa. (S.R.) B14 9.60
Economy,Pa. (D.R.)B14 11.90
Economy,(Staybolt)B14 12.20
McK.Rks.(Staybolt) L5 14.50
McK.Rks.(S.R.) L5 ....9.60
McK.Rks.(D.R.) L5 ....13.00

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ..3.70
Atlanta A11 ....4.25
Buffalo R2 ....3.70
Cleveland R2 ....3.70
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 ....3.70
Fontana,Calif. K1 ....4.40
Gary,Ind. U5 ....3.70
Houston,Tex. S5 ....4.10
Ind.Harbor,Ind. I-2, Y1 ..3.70
Johnstown,Pa. B2 ....3.70
KansasCity,Mo. S5 ....4.30
Lackawanna,N.Y. B2 ..3.70
LosAngeles B3 ....4.40
Milton,Pa. B6 ....4.20
Minnequa,Colo. C10 ....4.15
Niles,Calif. P1 ....5.03
Pittsburgh J5 ....3.70
Portland,Oreg. O4 ....4.65
Seattle B3, N14 ....4.45
So.Chicago R2,U5,W14 ..3.70
So.SanFran.,Cal. B3 ....4.45
Struthers,O. Y1 ....3.70
Torrance,Calif. C11 ....4.40
Weirton,W.Va. W6 ....3.85
Youngstown R2, U5 ....3.70

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10 ..... 4.35
Cleveland J5, R2 ..... 4.35
Ecorse,Mich. G5 ..... 4.55
Fairfield,Ala. T2 ..... 4.35
Follansbee,W.Va. F4 ..... 5.35
Fontana,Calif. K1 ..... 5.30
Gary,Ind. U5 ..... 4.35
GraniteCity,Ill. G4 ..... 5.05
Ind.Harbor,Ind. I-2, Y1 4.35
Irvin,Pa. U5 ..... 4.35
Lackawanna,N.Y. B2 ..... 4.35
Middletown,O. A10 ..... 4.35
Pittsburg,Calif. C11 ..... 5.30
Pittsburgh J5 ..... 4.35
SparrowsPoint,Md. B2 ..... 4.35
Steubenville,O. W10 ..... 4.35
Warren,O. R2 ..... 4.35
Weirton,W.Va. W6 ..... 4.35
Youngstown Y1 ..... 4.35

SHEETS, Galv'd No. 10 Steel

AlabamaCity,Ala. R2 ..... 4.80
Ashland,Ky.(8) A10 ..... 4.80
Canton,O. R2 ..... 4.80
Dover,O. R1 ..... 5.50
Fairfield,Ala. T2 ..... 4.80
Gary,Ind. U5 ..... 4.80
GraniteCity,Ill. G4 ..... 5.50
Ind.Harbor,Ind. I-2 ..... 4.80
Irvin,Pa. U5 ..... 4.80
Kokomo,Ind.(13) C16 ..... 5.20
MartinsFerry,O. W10 ..... 4.80
Niles,O. N12 ..... 6.00
Pittsburg,Calif. C11 ..... 5.55
SparrowsPoint,Md. B2 ..... 4.80
Steubenville,O. W10 ..... 4.80
Torrance,Calif. C11 ..... 5.55
Weirton,W.Va. W6 ..... 4.80

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5 ..... 7.20
SparrowsPoint(39) B2 ..... 6.75

SHEETS, Galvannealed Steel

Canton,O. R2 ..... 5.35
Irvin,Pa. U5 ..... 5.35
Kokomo,Ind.(13) C16 ..... 5.75
Niles,O. N12 ..... 6.55

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10 ..... 5.65
Middletown,O. A10 ..... 5.05

SHEETS, Electro Galvanized

Cleveland R2 (28) 5.65
Niles,O. R2 (28) 5.65
Weirton,W. Va. W6 ..... 5.50

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2 ..... 5.70

SHEETS, Drum Body

Pittsburg,Calif. C11 ..... 4.30
Torrance,Calif. C11 ..... 4.30

SHEETS, Well Casing

Fontana,Calif. K1 ..... 5.10
Torrance,Calif. C11 ..... 5.10

BLUED Stock, 29 ga.

Yorkville,O. W10 ..... 6.80
Follansbee,W.Va.(23) F4 6.85

ROOFING SHORT TERNES (8 lb. Coated)

Gary,Ind. U5 ..... 9.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2 ..... $7.60
Gary,Ind. U5 ..... 7.50
Irvin,Pa. U5 ..... 7.50
SparrowsPoint,Md. B2 .. 7.60
Yorkville,O. W10 ..... 7.50

SHEETS, LT. Coated Ternes, 6 lb

Yorkville,O. W10 ..... $8.40

SHEETS, Mfg. Ternes, 8 lb (Commercial Quality)

Gary,Ind. U5 ..... $9.50
Yorkville,O. W10 ..... 9.50

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 5.20
Gary,Ind. U5 ..... 5.20
Mansfield,O. E6 ..... 6.05
Middletown,O. A10 ..... 5.20
Niles,O. N12 ..... 6.00
Weirton,W.Va. W6 ..... 5.20

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ..... 5.60

SHEETS, Enameling Iron

Ashland,Ky.(8) A10 ..... 4.65
Cleveland R2 ..... 4.65
Gary,Ind. U5 ..... 4.65
GraniteCity,Ill. G4 ..... 5.35
Ind.Harbor,Ind. I-2 ..... 4.65
Irvin,Pa. U5 ..... 4.65
Middletown,O. A10 ..... 4.65
Youngstown Y1 ..... 4.65

SHEETS, Culvert No. 16	Cu Alloy	Cu Fe
Ashland,Ky. A10	5.60	...
Canton,O. R2	5.65	6.10
Fairfield,Ala. T2	5.60	5.85
Gary U5	5.60	5.85
IndianaHarbor I-2	5.60	5.85
Irvin,Pa. U5	5.60	5.85
Kokomo,Ind. C16	6.25	...
MartinsFy.O. W10	5.60	5.85
Pittsburg,Cal. C11	6.35	...
SparrowsPt. B2	5.60	...
Torrance,Cal. C11	6.35	...

SHEETS, Culvert, No. 16 Pure Iron

Ashland,Ky. A10 ..... 5.85
Fairfield,Ala. T2 ..... 5.85

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10 ..... 3.85
Cleveland R2 ..... 4.20
Ind.Harbor,Ind. I-2 ..... 3.85
Warren,O. R2 ..... 4.20

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 ..... 4.95
Middletown,O. A10 ..... 4.85
Warren,O. R2 ..... 4.95

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10 ..... 5.65
Canton,O. R2 ..... 5.55

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10 ..... 5.30
Middletown,O. A10 ..... 5.30

SHEETS, ALUMINIZED

Butler,Pa. A10 ..... 8.15

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.15	$7.40	$7.80
Fairfield,Ala. T2	7.25	7.50	7.90
Gary,Ind. U5	7.15	7.40	7.80
GraniteCity,Ill. G4	7.35	7.60	8.00
Ind.Harbor,Ind. I-2, Y1	7.15	7.40	7.80
Irvin,Pa. U5	7.15	7.40	7.80
Niles,O. R2	7.15	7.40	7.80
Pittsburg,Calif. C11	7.90	8.15	8.55
SparrowsPoint,Md. B2	7.25	7.50	7.90
Weirton,W.Va. W6	7.15	7.40	7.80
Yorkville,O. W10	7.15	7.40	7.80

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut Lengths ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom W10 (cut-lengths)	...	...	7.25	8.50	9.30
Brackenridge,Pa. A4	...	...	7.75	9.00	9.80
GraniteCity,Ill.G4 (cut lengths)	...	...	7.95	9.20	...
Ind.Harbor,Ind. I-2	6.95	7.25	(34)	...	...
Mansfield,O. E6 (cut lengths)	7.10	7.25	7.75	9.00	9.80
Niles,O. N12 (cut lengths)	...	6.75	7.25	...	...
Vandergrift,Pa. U5	...	7.25	7.75	9.00	9.80
Warren,O. R2	6.95	7.25	7.75	9.00	9.80
Zanesville,O. A10	...	7.25	7.75	9.00	9.80

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths ½c lower) Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	9.85	10.40	11.10	11.90
Brackenridge,Pa. A4	10.35	...	...	...
Vandergrift,Pa. U5	10.35	10.90	11.60	12.40
Warren,O. R2	10.35	...	...	...
Zanesville,O. A10	10.35	10.90	11.60	12.40

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	...	...	14.75	15.25
Vandergrift,Pa. U5	12.90	13.75	14.75	15.25

TINPLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.45	$8.70
Fairfield,Ala. T2	8.55	8.80
Gary,Ind. U5	8.45	8.70
Ind.Har. I-2, Y1	8.45	8.70
Irvin,Pa. U5	8.45	8.70
Pitts.Cal. C11	9.20	9.45
Sp.Pt.,Md. B2	8.55	8.80
Warren,O. R2	8.45	8.70
Weirton,W.Va. W6	8.45	8.70
Yorkville,O. W10	8.45	8.70

BLACK PLATE (Base Box)

Aliquippa,Pa. J5 ..... $6.25
Fairfield,Ala. T2 ..... 6.35
Gary,Ind. U5 ..... 6.25
GraniteCity,Ill. G4 ..... 6.45
Ind.Harbor,Ind. I-2, Y1 6.25
Irvin,Pa. U5 ..... 6.25
Niles,O. R2 ..... 6.25
Pittsburg,Calif. C11 ..... 7.00
SparrowsPoint,Md. B2 .. 6.35
Warren,O. R2 ..... 6.25
Weirton,W.Va. W6 ..... 6.25
Yorkville,O. W10 ..... 6.25

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4 ..... 5.85
Gary,Ind. U5 ..... 5.85
GraniteCity,Ill. G4 ..... 6.05
Ind.Harbor,Ind. Y1 ..... 5.30
Irvin,Pa. U5 ..... 5.85
Yorkville,O. W10 ..... 6.15

STRIP, Hot-Rolled Alloy

Bridgprt.Conn.(10) S15 .. 5.45
Carnegie,Pa. S18 ..... 5.85
Fontana,Calif. K1 ..... 6.70
Gary,Ind. U5 ..... 5.50
Houston,Tex. S5 ..... 5.90
KansasCity,Mo. S5 ..... 6.10
Midland,Pa. C18 ..... 5.85
NewBritn.Conn.(10) S15 5.45
Sharon,Pa. S3 ..... 5.85
Youngstown U5 ..... 5.50

STRIP, Hot-Rolled High-strength Low-Alloy

Bessemer,Ala. T2 ..... 5.30
Conshohocken,Pa. A3 .. 5.55
Ecorse,Mich. G5 ..... 5.95
Fairfield,Ala. T2 ..... 5.30
Fontana,Calif. K1 ..... 6.20
Gary,Ind. U5 ..... 5.30
Ind.Harb.,Ind. I-2 ..... 5.30
IndianaHarbor,Ind. Y1.. 5.80
Lackawanna,N.Y. B2 .. 4.95
LosAngeles(25) B3 ..... 6.05
Seattle,Wa. B3 ..... 6.30
Sharon,Pa. S3 ..... 5.40
So.SanFrancisco(25) B3 6.05
SparrowsPoint,Md. B2 .. 4.95
Warren,O. R2 ..... 5.30
Weirton,W.Va. W6 ..... 5.75
Youngstown Y1 ..... 5.80
Youngstown U5 ..... 5.30

STRIP, Cold-Rolled, High-Strength Low-Alloy

Cleveland J5 ..... 6.70
Cleveland A7 ..... 6.55
Dover,O. G6 ..... 7.30
Fontana,Calif. K1 ..... 6.95
Lackawanna,N.Y. B2 .. 6.40
Sharon,Pa. S3 ..... 6.55
SparrowsPoint,Md. B2 .. 6.40
Warren,O. R2 ..... 6.55
Weirton,W.Va. W6 ..... 7.20
Youngstown Y1 ..... 7.05

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ..... 3.50
Alton,Ill. L1 ..... 3.95
Ashland,Ky.(8) A10 ..... 3.50
Atlanta A11 ..... 4.05
Bessemer,Ala. T2 ..... 3.50
Bridgeprt.Conn.(10) S15 4.00
Buffalo(27) R2 ..... 3.50
Butler,Pa. A10 ..... 3.50
Carnegie,Pa. S18 ..... 4.00
Conshohocken,Pa. A3 ..... 3.90
Detroit M1 ..... 4.40
Ecorse,Mich. G5 ..... 3.80
Fairfield,Ala. T2 ..... 3.50
Fairfield,Calif. K1 ..... 4.75
Gary,Ind. U5 ..... 3.50
Houston,Tex. S5 ..... 4.90
Ind.Harbor,Ind. I-2, Y1 3.50
Johnstown,Pa.(25) B2 .. 3.50
KansasCity,Mo.(9) S5 .. 4.10
Lackawanna,N.Y.(32)B2 3.50
LosAngeles B3 ..... 4.25
Milton,Pa. B6 ..... 4.00
Minnequa,Colo. C10 .... 4.55
NewBritain(10) S15 .... 4.00
No.Tonawanda,N.Y. B11 3.50
Pittsburg,Calif. C11 .... 4.25
Riverdale,Ill. A1 ..... 3.50
SanFrancisco S7 ..... 4.85
Seattle B3, N14 ..... 4.50
Sharon,Pa. S3 ..... 4.00
So.Chicago,Ill. W14 .... 3.50
So.SanFrancisco B3 .... 4.25
SparrowsPoint,Md. B2 .. 3.50
Torrance,Calif. C11 .... 4.25
Warren,O. R2 ..... 3.50
Weirton,W.Va. W6 ..... 3.60
WestLeechburg,Pa. A4 .. 3.75
Youngstown U5, Y1 .... 3.50

STRIP, Cold-Rolled Alloy Steel

Bridgeprt.Conn.(10)S15 10.75
Carnegie,Pa. S18 ..... 10.60
Cleveland A7 ..... 10.00
Dover,O. G6 ..... 10.50
Fontana,Calif. K1 ..... 11.65
Harrison,N.J. C18 ..... 10.60
Midland,Pa. C18 ..... 10.60
NewBritn.Conn.(10)S15 10.75
Pawtucket,R.I.(11) NS .. 10.75
Pawtucket,R.I.(12) NS .. 11.05
Sharon,Pa. S3 ..... 10.60
Worcester,Mass. A7 .... 10.30
Youngstown C8 ..... 10.60

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6 .. 5.50
Berea,O. C7 ..... 6.60
Bridgeprt.Conn.(10) S15 5.35
Butler,Pa. A10 ..... 4.65
Cleveland A7, J5 ..... 4.65
Dearborn,Mich. D3 .... 5.60
Detroit D2 ..... 5.60
Detroit M1 ..... 5.45
Dover,O.(40) G6 ..... 5.50
Ecorse,Mich. G5 ..... 4.85
Follansbee,W.Va. F4 .... 5.35
Fontana,Calif. K1 .... 6.30
FranklinPark,Ill.(40)T6 4.90
Ind.Harbor,Ind. I-2 .... 4.90
Lackawanna,N.Y. B2 .... 4.65
LosAngeles C1 ..... 6.40
Mattapan,Mass. T6 .... 5.50
Middletown,O. A10 .... 4.65
NewBritain(10) S15 .... 5.35
NewCastle,Pa. B4 ..... 5.35
NewCastle(40) E5 ..... 5.25
NewHaven,Conn. D2 .... 5.85
NewHaven,Conn. A7 .... 5.15
Pawtucket,R.I. R3 .... 6.00
Pawtucket,R.I.(21) NS.. 5.85
Riverdale,Ill.(40) A1 .. 4.90
Rome,N.Y. R6 ..... 5.10
Sharon,Pa. S3 ..... 5.35
SparrowsPoint,Md. B2 .. 4.65
Trenton,N.J. R5 ..... 6.00
Wallingford,Conn. W2 .. 5.85
Warren,O.(40) T5 ..... 5.25
Warren,O. R2 ..... 4.65
Weirton,W.Va. W6 ..... 4.65
Youngstown C8 (40) 5.25
Youngstown Y1 ..... 4.65

STRIP, Electro Galvanized

Dover,O. G6 ..... 5.50
Warren,O. T5 ..... 5.25
Weirton,W.Va. W6 ..... 4.65
Youngstown C8 ..... 5.25

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7	...	6.80	7.40	9.35	11.65
Bridgeport,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
Bristol,Conn. W1	...	...	7.70	9.65	....
Carnegie,Pa. S18	...	6.80	7.40	9.35	11.65
Cleveland A7	4.65	6.45	7.40	9.35	11.65
Dearborn,Mich. D3	5.60	7.05	7.65	....	....
Detroit D2	5.60	6.65	7.25	....	....
Dover,O. G6	5.50	6.80	7.40	9.35	11.65
FranklinPark,Ill. T6	5.90	6.60	7.55	9.50	11.80
Harrison,N.J. C18	...	...	7.70	9.65	11.95
Mattapan,Mass. T6	5.50	6.75	7.70	9.65	11.95
NewBritn.Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
NewCastle,Pa. B4	5.35	6.80	7.40	9.35	....
NewCastle,Pa. E5	5.50	6.80	7.40	9.35	11.65
NewHaven,Conn. D2	5.85	6.75	7.35	....	....
NewYork W3	...	7.10	7.70	9.65	11.95
Pawtucket,R.I. NS: Cleve.or Pitts.Base	...	6.80	7.40	9.35	11.65
Worcester,Mass.,Base	5.85	7.10	7.70	9.65	11.95
Sharon,Pa. S3	5.35	6.80	7.40	9.35	11.65
Trenton,N.J. R5	...	7.10	7.70	9.65	11.95
Wallingford,Conn. W2	5.85	6.75	7.35	9.30	11.60
Weirton,W.Va. W6	5.35	6.80	7.40	9.35	11.65
Worcester,Mass. A7	4.95	6.75	7.40	9.65	11.95
Worcester,Mass. T6	5.50	6.75	7.70	9.65	11.95
Youngstown C8	...	6.80	7.40	9.35	11.65

Spring Steel (Tempered)					
Trenton,N.J. R5	...	...	10.30	12.50	15.35
Harrison,N.J. C18	...	...	10.30	12.50	15.35
NewYork W3	...	...	10.30	12.50	15.35

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Bolardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Co.
B14 A. M. Byers Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Columbia Steel & Shaft
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Corp.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire

G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky. (S) A10 ... 3.75
Warren,O. R2 ... 4.10

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 ... 5.25

TIGHT COOPERAGE HOOP

Atlanta A11 ... 4.65
Riverdale,Ill. A1 ... 3.90
Sharon,Pa. S3 ... 4.15
Youngstown U5 ... 3.75

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
AlabamaCity R2	5.70	5.95
Aliquippa Jo	5.70	6.15
Atlanta A11	5.95	6.40
Bartonville(19) K4	5.70	6.15
Buffalo W12	4.85	...
Cleveland A7	5.70	6.15
Crawfordsville M8	5.95	6.40
Donora,Pa. A7	5.70	6.15
Duluth,Minn. A7	5.70	6.15
Fairfield T2	5.70	6.15
Houston,Tex. S5	6.10	6.55
Johnstown B2	5.70	6.15
Joliet,Ill. A7	5.70	6.15
KansasCy,Mo. S5	6.30	6.75
Kokomo C16	5.80	6.05
LosAngeles B3	6.65	...
Minnequa C10	5.95	6.45
Monessen P7	5.95	6.40
Palmer W12	5.15	...
Pitts.,Calif. C11	6.65	6.80
Prtsmth.(18)P12	6.10	6.60
Rankin,Pa. A7	5.85	6.15
So.Chicago R2	5.70	5.95
So.S.Fran. C10	6.65	7.10
SparrowsPt. B2	5.80	6.25
Sterling,Ill.(1) N15	5.70	6.15
Struthers,O. Y1	5.70	6.15
Torrance,Cal. C11	6.65	...
Worcester A7	6.00	6.45

WIRE (16 gage)	An'ld	Galv. Stone	Stone
Aliquippa J5	10.15	12.15	
Bartonville(1) K4	10.25	11.95	
Cleveland A7	10.25	12.15	
Crawfrdsville M8	10.30	12.00	
Fostoria,O. S1	10.40	13.00	
Johnstown B2	10.25	12.15	
Kokomo C16	10.25	11.95	
Minnequa C10	10.40	12.40	
Palmer,Mass. W12	10.25	12.15	
Pitts.Cal. C11	10.60	12.50	
Prtsmth.(18) P12	10.55	12.30	
SparrowsPt. B2	10.35	12.25	
Waukegan A7	10.25	12.15	

ROPE WIRE

	(A)	(B)
Alton,Ill. L1	8.65	8.90
Bartonville,Ill. K4	8.55	8.80
Buffalo W12	8.55	8.80
Fostoria,O. S1	8.85	9.10
Johnstown,Pa. B2	8.55	8.80
Monessen,Pa. P16	8.55	8.80
Monessen,Pa. P7	8.80	9.05
Palmer,Mass. W12	8.85	9.10
Portsmouth,O. P12	8.55	8.80
Roebling,N.J. R5	8.85	9.10
SparrowsPt. B2	8.65	8.90
Struthers,O. Y1	8.55	8.80
Worcester J4, T6	8.85	9.10

(A) Plow and Mild Plow.
(B) Improved Plow.

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ... 4.85
Aliquippa,Pa. J5 ... 4.85
Atlanta A11 ... 5.10
Alton,Ill. L1 ... 5.05
Bartonville,Ill.(1) K4 ... 4.85
Buffalo W12 ... 4.85
Chicago W13 ... 5.10
Cleveland A7, C20 ... 4.85
Crawfordsville,Ind. M8 ... 5.10
Donora,Pa. A7 ... 4.85
Duluth,Pa. A7 ... 4.85
Fairfield,Ala. T2 ... 4.85
Fostoria,O.(24) S1 ... 5.35
Houston S5 ... 5.25
Johnstown,Pa. B2 ... 4.85
Joliet,Ill. A7 ... 4.85
KansasCity,Mo. S5 ... 5.45
Kokomo,Ind. C16 ... 4.95
LosAngeles B3 ... 5.80
Minnequa,Colo. C10 ... 5.10
Monessen,Pa. P7 ... 5.10
Newark, 6-8 ga. I-1 ... 5.50
No.Tonawanda B11 ... 4.85
Palmer,Mass. W12 ... 5.15
Pittsburg,Calif. C11 ... 5.80
Portsmouth,O. P12 ... 5.25
Rankin,Pa. A7 ... 4.85
So.Chicago,Ill. R2 ... 4.85
So.SanFrancisco C10 ... 5.80
SparrowsPoint,Md. B2 ... 4.95
Sterling,Ill.(1) N15 ... 4.85
Struthers,O. Y1 ... 4.85
Torrance,Calif. C11 ... 5.80
Waukegan,Ill. A7 ... 4.85
Worcester,Mass. A7, T6 ... 5.15

WIRE, Cold-Rolled Flat

Anderson,Ind. G6 ... 6.20
Buffalo W12 ... 6.35
Cleveland A7 ... 5.85
Crawfordsville,Ind. M8 ... 6.20
Detroit D2 ... 6.20
Dover,O. G6 ... 6.20
Fostoria,O. S1 ... 6.00
Kokomo,Ind. C16 ... 5.70
FranklinPark,Ill. T6 ... 6.20
Massillon,O. R8 ... 5.85
Monessen,Pa. P16 ... 5.85
Monessen,Pa. P7 ... 6.10
NewHaven,Conn. D2 ... 6.50
Pawtucket,R.I.(12) NS ... 6.85
Trenton,N.J. R5 ... 6.15
Worcester A7 ... 6.15
Worcester T6 ... 6.50
Worcester W12 ... 6.65

WIRE, Fine & Weaving(8" Coils)

Bartonville,Ill.(1) K4 ... 8.90
Buffalo W12 ... 8.90
Chicago W13 ... 8.90
Cleveland A7 ... 8.90
Crawfordsville,Ind. M8 ... 8.95
Fostoria,O. S1 ... 8.90
Johnstown,Pa. B2 ... 8.90
Kokomo,Ind. C16 ... 8.90
Monessen,Pa. P16 ... 8.90
Palmer,Mass. W12 ... 9.20
Portsmouth,O. P12 ... 8.90
Roebling,N.J. R5 ... 9.20
Waukegan,Ill. A7 ... 8.90
Worcester,Mass. A7, T6 ... 9.20

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4 ... 8.50
Monessen,Pa. P16 ... 8.50
Roebling,N.J. R5 ... 8.80
SparrowsPoint,Md. B2 ... 8.60
Johnstown,Pa. B2 ... 8.50

WIRE, Tire Bead

Bartonville,Ill.(1) K4 ... 10.90
Monessen,Pa. P16 ... 11.40
Roebling,N.J. R5 ... 11.55

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5 ... 6.25
Alton,Ill. L1 ... 6.45
Bartonville,Ill.(1) K4 ... 6.25
Buffalo W12 ... 6.25
Cleveland A7 ... 6.25
Donora,Pa. A7 ... 6.25
Duluth A7 ... 6.25
Fostoria,O. S1 ... 6.25
Johnstown,Pa. B2 ... 6.25
LosAngeles B3 ... 7.20
Millbury,Mass.(12) N6 ... 8.05
Monessen,Pa. P7, P16 ... 6.25
Palmer,Mass. W12 ... 6.55
Pittsburg,Calif. C11 ... 7.20
Roebling,N.J. R5 ... 6.55
Portsmouth,O. P12 ... 6.25
So.Chicago,Ill. R2 ... 6.25
So.SanFrancisco C10 ... 7.20
SparrowsPoint,Md. B2 ... 6.35
Struthers,O. Y1 ... 6.25
Trenton,N.J. A7 ... 6.55
Waukegan,Ill. A7 ... 6.25
Worcester A7, T6, W12 ... 6.55
Worcester,Mass. J4 ... 6.75

WIRE, Upholstery Spring

Aliquippa,Pa. J5 ... 5.90
Alton,Ill. L1 ... 6.10
Buffalo W12 ... 5.90
Cleveland A7 ... 5.90
Donora,Pa. A7 ... 5.90
Duluth,Minn. A7 ... 5.90
Johnstown,Pa. B2 ... 5.90
LosAngeles B3 ... 6.85
Monessen,Pa. P7, P16 ... 5.90
Newhaven,Conn. A7 ... 6.20
Palmer,Mass. W12 ... 6.20
Pittsburg,Calif. C11 ... 6.85
Portsmouth,O. P12 ... 5.90
Roebling,N.J. R5 ... 6.20
So.Chicago,Ill. R2 ... 5.90
So.SanFrancisco C10 ... 6.85
SparrowsPoint,Md. B2 ... 6.00
Torrance,Calif. C11 ... 6.85
Trenton,N.J. A7 ... 6.20
Waukegan,Ill. A7 ... 5.90
Worcester,Mass. A7 ... 6.20

WOVEN FENCE, 9-15½ Ga.

	Col.
AlabamaCity,Ala. R2	126
Ala.City,Ala. 17-18ga.R2	213
Aliquippa,Pa.9-14½ga.J5	130
Atlanta A11	133
Bartonville,Ill.(19) K4	130
Crawfordsville,Ind. M8	132
Donora,Pa. A7	130
Duluth,Minn. A7	130
Fairfield,Ala. T2	130
Houston,Tex. S5	138
Johnstown,Pa. B2	130
Johnstown,17ga.,6" B2	204
Johnstown,17ga.,4" B2	207
Joliet,Ill. A7	130
KansasCity,Mo. S5	142
Kokomo,Ind. C16	132
Minnequa,Colo. C10	138
Monessen,Pa. P7	135
Pittsburg,Calif. C11	153
Portsmouth,O.(18) P12	137
Rankin,Pa. A7	130
So.Chicago,Ill. R2	126
Sterling,Ill.(1) N15	130

FENCE POSTS

ChicagoHts.,Ill. C2	140
Duluth,Minn. A7	125
Franklin,Pa. F5	140
Huntington,W.Va. W7	140
Johnstown,Pa. B2	140
Marion,O. P11	140
Minnequa,Colo. C10	130
Moline,Ill. R2	136
So.Chicago R2	140
Tonawanda,N.Y. B12	140
Williamsport,Pa. S19	150

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	136
Aliquippa,Pa. J5	140
Atlanta A11	143
Bartonville,Ill.(19) K4	143
Crawfordsville,Ind. M8	145
Donora,Pa. A7	140
Duluth,Minn. A7	140
Fairfield,Ala. T2	140
Houston,Tex. S5	148
Johnstown,Pa. B2	140
Joliet,Ill. A7	140
KansasCity,Mo. S5	152
Kokomo,Ind. C16	142
Minnequa,Colo. C10	146
Monessen,Pa. P7	145
Pittsburg,Calif. C11	160
Portsmouth,O.(18) P12	147
Rankin,Pa. A7	140
So.Chicago,Ill. R2	136
So.SanFran.,Calif. C10	160
SparrowsPoint,Md. B2	142
Sterling,Ill.(1) N15	140

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	123
Atlanta A11	126
Bartonville,Ill.(19) K4	123
Crawfordsville,Ind. M8	132
Donora,Pa. A7	123
Duluth,Minn. A7	123
Fairfield,Ala. T2	123
Joliet,Ill. A7	123
KansasCity,Mo. S5	135
Kokomo,Ind. C16	125
Minnequa,Colo. C10	128
Pittsburg,Calif. C11	147
So.Chicago,Ill. R2	123
So.SanFran.,Calif. C10	147
SparrowsPoint,Md. B2	125
Sterling,Ill.(1) N15	123

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2	6.10
Bartonville,Ill.(19) K4	5.95
Crawfordsville,Ind. M8	6.30
Donora,Pa. A7	5.95
Duluth,Minn. A7	5.95
Johnstown,Pa. B2	5.95
Joliet,Ill. A7	5.95
Kokomo,Ind. C16	6.05
Minnequa,Colo. C10	6.20
Pittsburg,Calif. C11	6.90
Portsmouth,O. P12	6.25
Rankin,Pa. A7	5.95
So.Chicago,Ill. R2	6.10
SparrowsPoint,Md. B2	6.05
Sterling,Ill.(1) N15	5.65
Worcester,Mass. A7	6.25

NAILS, Cut (100 lb keg)

To dealers (33)	
Conshohocken,Pa. A3	$7.35
Wheeling,W.Va. W10	7.35

NAILS & STAPLES, Stock

To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	118
Aliquippa,Pa.(13) J5	118
Atlanta A11	121
Bartonville,Ill.(19) K4	118
Chicago,Ill. W13	118
Cleveland A9	125
Crawfordsville,Ind. M8	122
Donora,Pa. A7	118
Duluth,Minn. A7	118
Fairfield,Ala. T2	118
Galveston,Tex. D7	126
Houston,Tex. S5	126
Johnstown,Pa. B2	118
Joliet,Ill. A7	118
KansasCity,Mo. S5	130
Kokomo,Ind. C16	120
Minnequa,Colo. C10	123
Monessen,Pa. P7	124
Pittsburg,Calif. C11	137
Portsmouth,O. P12	124
Rankin,Pa. A7	118
So.Chicago,Ill. R2	118
SparrowsPoint,Md. B2	120
Sterling,Ill.(1) N15	118
Torrance,Calif. C11	138
Worcester,Mass. A7	124

STANDARD TRACK SPIKES

Ind.Harbor,Ind. I-2, Y1	6.15
KansasCity,Mo. S5	6.40
Lebanon,Pa. B2	6.15
Minnequa,Colo. C10	6.15
Pittsburgh J5	6.15
Seattle B3	6.65
So.Chicago,Ill. R2	6.15
Struthers,O. Y1	6.15
Youngstown R2	6.15

TRACK BOLTS (20) Treated

KansasCity,Mo. S5	9.85
Lebanon,Pa.(32) B2	9.85
Minnequa,Colo. C10	9.85
Pittsburgh O3, P14	9.85
Seattle B3	10.35

TIE PLATES

Atlanta,Ala. T2	4.50
Gary,Ind. U5	4.50
Ind.Harbor,Ind. I-2	4.50
Lackawanna,N.Y. B2	4.50
Minnequa,Colo. C10	4.50
Pittsburg,Calif. C11	4.65
Seattle B3	4.65
Steelton,Pa. B2	4.50
Torrance,Calif. C11	4.65

JOINT BARS

Bessemer,Pa. U5	4.70
Fairfield,Ala. T2	4.70
Ind.Harbor,Ind. I-2	4.70
Joliet,Ill. U5	4.70
Lackawanna,N.Y. B2	4.70
Minnequa,Colo. C10	4.70
Steelton,Pa. B2	4.70

AXLES

Ind.Harbor,Ind. S18	5.60
Johnstown,Pa. B2	5.60

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	3.60	3.50	3.55	4.00
Ensley,Ala. T2	3.60	3.50	...	4.00
Fairfield,Ala. T2	...	...	...	4.00
Gary,Ind. U5	3.60	3.50	3.55	...
Huntington,W.Va. W7	...	...	...	5.00
Ind.Harbor,Ind. I-2	3.60	3.50	3.55	...
Johnstown,Pa. B2	...	...	...	(16)4.00
Lackawanna B2	3.60	3.50	...	4.00
Minnequa,Colo. C10	3.60	3.50	...	4.50
Steelton,Pa. B2	3.60	3.50	...	...
Williamsport,Pa. S19	...	...	...	4.75

TOOL STEEL

—Grade by Analysis—

Grade	$ per lb	W	Cr	V	Co	Mo	$ per lb
Reg. Carbon	0.230	20	4	1	12	25	3.535-3.675
Extra Carbon	0.270	19	4	2	7	...	2.460
Spec. Carbon	0.325	18	4	1	5	4.75	2.125
Oil Hardening	0.350	18	4	2	9	...	2.445-2.450
5%CrHotWrk	0.350	13.5	4	3	...	...	1.60¾
Hi-Carbon-Cr	0.635	6.4	4.5	1.9	...	5	0.96-0.965
18W,4Cr,1V	1.505	6	4	3	...	6	1.190
18W,4Cr,2V	1.650	1.5	4	1	...	8.5	0.810

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2, V3.

Key to Producers

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.

N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 NewEng-HighCarb.,Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst. Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
U1 Ulster Iron Works
U4 Universal Cyclops Steel
U5 United States Steel Co.
V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West. Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
Y1 YoungstownSheet&Tube

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6" in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pittsburgh base.
(12) Worcester, Mass. base.
(13) Add 0.10c for 17 Ga. & heavier.
(14) Also wide flange beams.
(15) 54" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. base.
(22) Del. San Fran. Bay area.
(23) 28 Ga. 36" wide.
(24) Deduct 0.20c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, mill lengths, to fabricators; to consumers, 0.5c higher.
(27) Bar mill sizes.
(28) Bonderized.
(29) Subject to 10% increase.
(30) Sheared; add 0.35c for universal mill.
(31) Not annealed.
(32) Bd. edge or square edge.
(33) To jobbers, deduct 20 cents.
(34) 7.25c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter: 60" & narrower.
(38) 14 gage & lighter: 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.

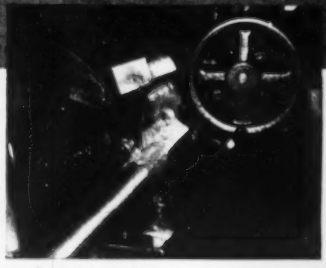
What are U. S. Rubber grinding wheels doing for stainless steel fabricators?

SMOOTHING STAINLESS STEEL welds on the baffle plates of a textile dyeing tank. The surfaces must be extremely smooth, so cloth will not snag, nor the dye become embedded anywhere. Textile materials cross these surfaces at a speed of 125 yards a minute.

As an example, many makers of expensive stainless steel textile dyeing and finishing equipment depend on U. S. *Royalite* and *Vulcanite* Grinding Wheels to help give their products their high state of perfection.

Over 88 years of experience and research in bonds and abrasives stand behind each of the wheels in the U.S. Rubber line. Whatever your grinding problem may be, a "U.S." Wheel can handle it. Write to address below.

PRODUCTS OF U.S.RUBBER SERVING THROUGH SCIENCE



CENTERLESS GRINDING the stainless steel tubing which is used as rollers in textile dyeing and finishing tanks. A centerless grinder equipped with U.S. *Vulcanite* Grinding and Regulating wheels is used.

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % —Black— A	B	C	—Galvanized— D	E	F
⅛	5.56	0.24	34.0	32.0	29.0	1.5	−0.5	−3.5
¼	6.0	0.42	28.5	26.5	23.5	−1.0	−3.0	−6.0
⅜	6.0	0.57	23.5	21.5	18.5	−7.0	−9.0	−12.0
½	8.5	0.85	36.0	34.0	33.0	14.0	12.0	13.0
¾	11.5	1.18	39.0	37.0	38.0	18.0	16.0	17.0
1	17.0	1.68	41.5	39.5	40.5	21.5	19.5	20.5
1¼	23.0	2.28	43.0	41.0	41.0	22.0	24.0	21.0
1½	27.5	2.78	42.5	41.5	41.5	21.0	21.5	22.0
2	37	3.68	43.0	41.0	42.0	23.5	21.5	22.5
2½	58.5	5.82	44.5	41.5	42.5	24.0	22.0	23.0
3	76.5	7.62	43.5	41.5	42.5	24.0	22.0	23.0

Column A: Etna, Pa. N2; Butler, Pa. ⅛–⅜", F6; Benwood, W. Va. 3½ points lower on ⅛", 1½ points lower on ¼", and 2 points lower on ⅜". W10; Sharon, Pa. M6, 1 point higher on ⅛", 2 points lower on ¼" and ⅜". Following make ½" and larger: Lorain, O., N3; Youngstown R2 and 26½% on 3½" and 4", Youngstown Y1, Aliquippa, Pa. J5; Fontana, Calif. K1 quotes 11½ points lower on ½" and larger continuous weld and 24½ on 3½" and 4". Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., ½" through 3", Y1, Alton, Ill., 2 points lower discount L1.

Column D: Butler, Pa. F6, ⅛–⅜"; Benwood, W. Va. W10, except plus 3½% on ⅛", plus 2½% on ¼" plus 9% on ⅜"; Sharon, Pa. M6, plus 0.5 on ⅛"; 1 point lower on ½" to 1", 2 points lower on 1¼" and 1½", 2 points lower on 2" to 3". Following quote only on ½" and larger: Lorain, O. N3; Youngstown R2, and 16½% on 3½" and 4"; Youngstown Y1. Aliquippa, Pa. J5 quotes 1 point lower on ½" to 1", 2 points lower on 1¼" to 2", 2 points lower on 2½" and 3"; Etna, Pa. N2 and 18½% on 3½" and 4".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Galv. B	Elec. Weld Black C	Galv. D
2	37.00	3.68	29.5	9.5	29.5	9.5
2½	58.5	5.82	32.5	12.5	32.5	12.5
3	76.5	7.62	32.5	12.5	32.5	12.5
3½	92.0	9.20	34.5	14.5	34.5	14.5
4	$1.09	10.88	34.5	14.5	34.5	14.5
5	1.48	14.81	37.0	17.0	37.0	17.0
6	1.92	19.18	37.0	17.0	37.0	17.0

Column A: Aliquippa J5; Ambridge N2, Lorain N3; Youngstown Y1.

Column B: Aliquippa J5 quotes 1½ pts lower on 2", 1 pt lower on 2½–6 in.; Lorain N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	—Seamless— H.R.	C.D.	Elec. Weld H.R.	C.D.
1	13	13.16	16.17	13.56	15.36
1¼	13	16.09	19.74	15.61	18.19
1½	13	17.27	21.15	17.25	20.30
1¾	13	19.29	23.62	19.62	23.09
2	13	21.62	26.48	21.99	25.86
2¼	13	24.35	29.82	24.56	28.84
2½	12	28.92	32.97	28.08	31.76
2¾	12	29.64	36.32	29.57	34.76
3½	12	32.11	39.33	31.33	36.84
3	12	34.08	41.64	32.86	38.70

CLAD STEELS

(Cents per pound)

Cladding Stainless	—Plates— Carbon Base 10%	20%	—Strip— Cold-Rolled Carbon Base 10%	Both Sides	—Sheets— Carbon Base 10%	20%	Both Sides	Cu Base
302	...	...	...	...	19.75	26.24	27.50	77.00
304	25.00	29.50	...	...	24.50	27.50	27.50	77.00
309	30.50	35.00	...	...	...	...	...	144.00
310	36.50	41.00	...	...	...	...	...	...
316	29.50	34.00	...	...	26.00	35.92	36.50	...
317	34.50	39.00	...	...	...	...	...	...
318	33.50	38.00	...	...	...	...	...	...
321	26.50	31.00	...	...	23.00	33.00	33.83	111.00
347	27.50	32.00	...	...	24.00	33.50	33.83	130.00
405	21.25	27.75	...	...	...	...	...	...
410	26.75	27.25	...	...	...	...	...	...
Nickel	33.50	45.15	41.00	51.00	...	...	...	...
Inconel	41.25	54.18	...	...	...	...	...	165.00
Monel	34.50	46.28	...	...	...	...	...	...
Copper	...	...	23.50	29.65	...	...	...	...

Deoxidized 20.20c for hot-rolled, 26.10c for hot-rolled. Production points for carbon base products: Stainless plates, sheet Coatesville, Pa., A3 and New Castle, Ind. I4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. I7 and Washington, Pa. J5; nickel, inconel, monel-clad plates, Coatesville I7; nickel, copper-clad strip, Carnegie, Pa., S18. Production point for copper-base sheets is Carnegie, Pa. A14.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:	
½-in. & smaller diam.	15
⅝-in. & ¾-in.	13.5
7/8-in. and larger	17.5
Longer than 6 in.:	
All diams.	14
Lag bolts, all diams.:	
6 in. and shorter	23
over 6 in. long	21
Ribbed Necked Carriage	18.5
Blank	34
Plow	34
Step, Elevator, Tap, and Sleigh Shoe	21
Tire bolts	12
Boiler & Fitting-Up bolts	31

NUTS

	Reg.	Hvy.
H.P. & C.P. Square:		
½-in. & smaller	15	15
⅝-in. & ¾-in.	12	6.5
7/8-in.-1½-in.	9	1
1⅝-in. & larger	7	1
H.P. Hex.		
½-in. & smaller	26	22
⅝-in. & ¾-in.	16.5	6.5
7/8-in.-1½-in.	12	2
1⅝-in. & larger	8.5	2
C.P. Hex.		
½-in. & smaller	26	22
⅝-in. & ¾-in.	23	17.5
7/8-in. & 1½-in.	19.5	12
1⅝-in. & larger	12	6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

	Reg.	Hvy.
½-in. & smaller	35	28.5
⅝-in. & ¾-in.	29.5	22
7/8-in.-1½-in.	24	15
1⅝-in. & larger	13	8.5
		Light
½-in. & smaller		33
⅝-in. to ¾-in.		28.5
7/8-in. & larger		26

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish	18 & 10
Plated finishes	31 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged, per cent off list)

6 in. or shorter:	
¾-in. & smaller	42
⅞-in. through 1 in.	34
Longer than 6 in.:	
¾-in. & smaller	26
⅞-in. through 1 in.	4

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter	38
1 in. and smaller diam. x over 6 in.	26

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	35
¼-in. diam. & larger	16
N.F. thread, all diams.	10

RIVETS

F.o.b. midwestern plants

Structural, ½-in., larger 7.85c

⅝-in. under 26 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ... List to list-plus-$1.

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective

CaF_2 content, 70%, $43; 60%, $36.

Imported, net ton, duty paid, metallurgical grade, $33-$35.

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Inches Diam.	Length	Cents per lb
17.18.20	60.72	17.8
8 to 16	48.60.72	17.8
7	48.60	19.7
6	48.60	20.95

CARBON

35 to 40	110	8.65
30	65.84.110	8.65
24	72 to 104	8.65
17 to 20	34 to 80	8.65

STAINLESS STEEL

Type	Sheets	C.R. Strip	Struc-turals	Bars	Wire
302	41.00	41.00	31.25		
302	41.25	36.75	31.50		
303	43.25	40.25	34.00		
304	43.25	38.75	33.00		
309	56.00	55.00	44.75		
316	51.00	50.00	40.25		
316	56.50	50.50	45.25		
316	57.00	57.00	45.75		
317	55.75	52.25	41.50		
320	56.50	50.50	45.25		
321	47.00	47.00	37.25		
329	44.00	47.00	31.25		
330	39.00	31.00	24.25		
501	24.00	28.00	14.25		
502	28.50	27.00	16.25		

Bait., Types 301-347 sheet, quotes slight variations on Types 301-317.

Brdgeville, Pa., bars, wire, except 305 and 306 F2.

Brackenridge, Pa., sheets A4 sheets & strip U4.

Butler, Pa., sheets and strip except Types 303, 305, 416, 420, 501 & 502, A10.

Carnegie, Pa., sheets and strip except Types 303, 416, 501 & 502 and 0.2c lower on Types 302, 304, 321, 347, 0.5c lower on Types 308 and 316 S18.

Cleveland, strip A7.

Detroit, strip M1 quotes 34.00c on Type 301; 36.50c, 302; 38.50c, 304; 58.50c, 316; 52.00c, 347, 30.50c, 410; 31.00c, 430.

Dunkirk, N. Y., bars, wire A4 quotes slight variations on Types 301-347.

Duquesne, Pa., bars U5.

Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6 quotes slight variations on Types 301-347.

Gary, Ind., sheets except Type 416 U5.

Harrison, N. J., strip and wire C18.

Massillon, O., all items R2.

Mckeesport, Pa., strip, Type 410, bars & wire, Types 410 through 430 and 31.25c on Type 302, 33.75c on 303, 32.75c on 304, 48.75c on 316, 36.75c on 321, 41.25c on 347 F2.

Mckeesport, Pa., bars, sheets except Type 416 U5.

Middletown, O., sheets and strip, except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars U5.

Pittsburgh, sheets C14.

Reading, Pa., strip except 34.25c on Type 301 and 56.00c on 309; bars, except 31.50c on Type 501 and 45.25c on 308 C9.

Sharon, Pa., strip, except Types 303, 309, 416, 501, 502 and 34.25c on Type 301 S3.

So. Chicago, Ill., bars & structurals U5.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars, I4.

Wallingford, Conn., strip, W2 quotes 0.25c higher.

Washington, Pa., bars, sheets & strip, except 0.25c higher on Type 301 J3.

Washington, Pa., Types 301 through 347 sheets & strip except 303, 309, 316 sheets 62.00c; strip 61.00c W4.

Watervliet, N. Y., structurals & bars A4 quotes slight variations on Types 301-347.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip A4 quotes slight variations on Types 301-347.

Youngstown, strip, except Types 302, 309, 316, 416, 501 and 502 and 34.25c on Type 301.

COAL CHEMICALS

Spot, cents per gallon, oven:

Pure benzol 30.00-35.00

Toluol, one deg. 26.00-33.00

Industrial xylol 25.00-33.50

Per ton bulk, ovens

Sulphate of ammonia $32 $35

Cents per pound, ovens

Phenol, 40 carlots, non-returnable drums ... 17.25

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron	
98.5% Fe, carlots	17.00
Swedish, c.i.f. New York, in bags	8.85-9.95
Electrolytic Iron,	
Annealed, 99.5% Fe	42.50
Unannealed, 99+% Fe	36.50
Unannealed, 99+% Fe minus 325 mesh	58.50
Powder Flakes	48.50
Carbonyl Iron:	
97.9-99.8% size 5 to 10 microns	83.00-148.00
Aluminum:	
Carlots, freight allowed	29.50
Atomized, 500 lb drums, freight allowed	33.50
Antimony	75.85
Brass, 10-ton lots	30.00-33.25
Bronze, 10-ton lots	51.25-60.00
Phosphor-Copper, 10 ton lots	50.00
Copper:	
Electrolytic	37.25-46.25
Reduced	33.75-37.00
Lead	25.50
Magnesium	75.00-85.00
Manganese:	
Minus 100-mesh	57.00
Minus 35 mesh	52.00
Minus 200 mesh	62.00
Nickel unannealed	86.00
Nickel-Silver, 10-ton lots	45.00
Silicon	38.50
Solder (plus cost of metal)	8.50
Stainless Steel, 302	83.00
Zinc, 10-ton lots	23.00-30.50
Tungsten	Dollars
Melting grade 99%, 6m to 200 mesh, freight allowed:	
1000 lb and over	6.00
Less than 1000 lb	6.15
98.8% minus 63 mesh, freight allowed:	
1000 lb and over	4.15
Less than 1000 lb	4.25
Molybdenum:	
99.9+ minus 200 mesh	3.25
Chromium, electrolytic 99% Cr min.	3.50

METALLURGICAL COKE

Price per net ton

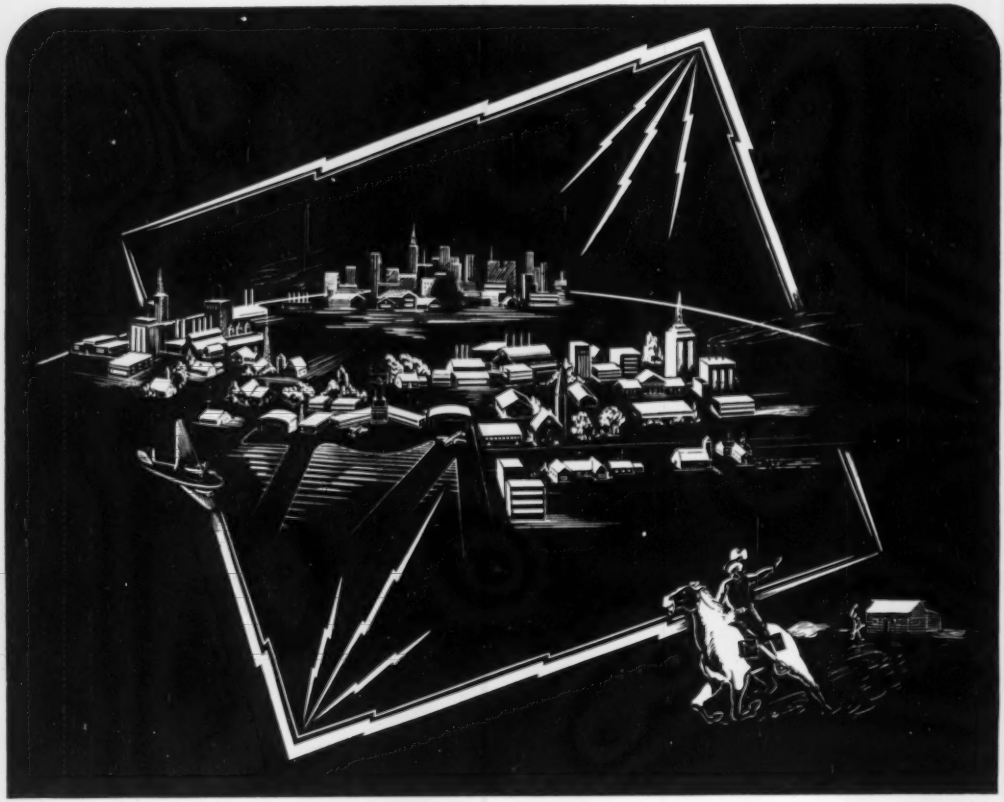
BEEHIVE OVENS

Connellsvill fur.	$14.50-15.00
Connellsvill fdry.	17.00-18.00
New River foundry	21.00
Wise county, foundry	15.00
Wise county, furnace	15.00

OVEN FOUNDRY COKE

Kearny, N. J., ovens	$22.75
Everett, Mass., ovens	
New England, del.	24.80
Chicago, ovens	22.00
Chicago, del.	24.50
Terre Haute, ovens	22.50
Milwaukee, ovens	24.75
Indianapolis, ovens	22.75
Chicago, del.	26.42
Cincinnati, del.	25.85
Detroit, del.	26.85
Ironton, O., ovens	22.50
Cincinnati, del.	25.42
Painesville, O., ovens	24.00
Cleveland, del.	25.82
Erie, Pa., ovens	23.50
Birmingham, ovens	20.50
Birmingham, del.	21.80
Philadelphia, ovens	22.70
New England Pa. ovens	23.00
Swedeland, Pa., ovens	22.60
St. Louis, ovens	
St. Louis, del.	25.40
Portsmouth, O., oven	22.50
Cincinnati, del.	25.42
Detroit, ovens	24.00
Detroit, del.	25.00
Buffalo, del.	26.80
Flint, del.	26.50
Pontiac, del.	25.47
Saginaw, del.	26.92

... or within $4.15 freight zone from works.



SINCE 1850

THE COMMUNICATIONS INDUSTRY

in its advance from the hard riding pony express to instantaneous communication throughout the world, has been paced by the production and transportation of the necessary ores from which have been made the metals that have made its developments possible.

LAKE SUPERIOR IRON ORE • FERRO ALLOYS
VESSEL TRANSPORTATION • COAL

THE Cleveland-Cliffs IRON COMPANY
UNION COMMERCE BUILDING • CLEVELAND 14, OHIO

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140‡		Carbon	Floor
New York (city)	6.27	7.29	8.44	6.59	...	6.42	7.29	9.25	6.40	6.58	8.04
New York(c'try)	5.97	6.99	8.14	6.29	...	6.12	6.99	8.95	6.10	6.28	7.74
Boston (city)	6.40	7.20	8.49	6.35	...	6.25	7.04	9.25	6.40	6.98	7.88
Boston (c'try)	6.20	7.00	8.29	6.15	...	6.05	6.84	9.05	6.20	6.78	7.68
Phila. (city)	6.15	7.05	8.25	6.35	...	6.30	7.11	8.90	6.15	6.30	7.40
Phila. (c'try)	5.90	6.80	8.00	6.10	...	6.05	6.86	8.65	5.90	6.05	7.15
Balt. (city)	5.80	7.04	8.27	6.24	...	6.24	7.09	...	6.34	6.00	7.64
Balt. (c'try)	5.60	6.84	8.07	6.04	...	6.04	6.89	...	6.14	5.80	7.44
Norfolk, Va.	6.50	...	...	6.70	...	6.55	7.70	...	6.60	6.50	8.00
Richmond, Va.	5.90	...	8.10	6.10	...	6.10	6.90	...	6.30	6.05	7.80
Wash. (w'hse)	6.02	7.26	8.49	6.46	...	6.46	7.26	...	6.56	6.22	7.86
Buffalo (del.)	5.80	6.60	8.29	6.06	...	5.80	6.65	10.65††	6.00	6.25	7.55
Buffalo (w'hse)	5.60	6.40	8.09	5.86	...	5.60	6.45	10.45††	5.80	6.05	7.35
Pitts. (w'hse)	5.60	6.40*	7.75	5.65-5.95	6.90	5.55	6.40	10.10††	5.70	5.75	7.00
Detroit (w'hse)	5.45-5.78	6.53-6.80	7.99	5.94-5.95	7.75	5.84	6.56	8.91	6.09	6.19-6.35	7.28
Cleveland (del.)	5.80	6.60	8.30	5.89	7.10	5.77	6.60-6.70	8.91	10.02	6.12	7.82
Cleve. (w'hse)	5.60	6.40	8.10	5.69	6.90	5.57	6.40-6.50	8.71	5.82	5.92	7.12
Cincin. (city)	6.02	6.59	7.34	5.95	...	5.95	6.51	...	6.24	6.34	7.50
Chicago (city)	5.80	6.60	7.95	5.75	...	5.75	6.50	10.30	5.90	6.00	7.20
Chicago (w'hse)	5.60	6.40	7.75	5.55	...	5.55	6.30	10.10	5.70	5.80	7.00
Milwaukee (city)	5.94	6.74	8.09	5.89	...	5.89	6.74	10.44	6.04	6.14	7.34
Milwau. (c'try)	5.74	6.54	7.89	5.69	...	5.69	6.54	10.24	5.84	5.94	7.14
St. Louis (del.)	6.05	6.85	8.20	6.00	...	6.00	6.85	10.55	6.23	6.33	7.53
St. L. (w'hse)	5.85	6.65	8.00	5.80	...	5.80	6.65	10.35	6.03	6.13	7.33
Kans. City(city)	6.40	7.20	8.40	6.35	...	6.35	7.20	...	6.50	6.60	7.80
KansCity(w'hse)	6.20	7.00	8.20	6.15	...	6.15	7.00	...	6.30	6.40	7.60
Birm'hm (city)	5.75	6.55	6.90§	5.70	...	5.70	7.53	...	5.85	6.10	8.25
Birm'hm(w'hse)	5.60	6.40	6.75§	5.55	...	5.55	7.53	...	5.70	5.95	8.23
Los Ang. (city)	6.55	8.10	9.05§	6.60	8.90	6.55	7.75	...	6.55	6.60	9.20
L. A. (w'hse)	6.35	7.90	8.85§	6.40	8.70	6.35	7.55	...	6.35	6.40	8.70
San Francisco	6.65	7.80§	8.90§	6.60	...	6.45	8.20	...	6.45	6.50	8.60
Seattle-Tacoma	7.05	8.60§	9.20§	7.30	...	6.75	9.10	11.15	6.65	6.75	8.80

Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; *—500 to 1499 lb; §—450 to 1499 lb; ‡—3500 lb and over; ††—1000 to 1999 lb.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural), lower lake ports.

After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in applicable lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

Old range bessemer	$8.70
Old range nonbessemer	8.55
Mesabi bessemer	8.45
Mesabi nonbessemer	8.30
High phosphorus	8.30

Eastern Local Ore

Cents per unit, del. E. Pa.

Foundry and basic 56-62% concentrates, contract	17.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hematites	17.00
Brazilian iron ore, 68-69%	24.00-25.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$65.00
Domestic scheelite, mines	65.00

Manganese Ore

Manganese, 48%, nearby, $1.18-$1.22 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 79.8-81.8c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00

South African Transvaal

44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00

Brazilian

44% 2.5:1 lump	$32.00

Rhodesian

45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00
Domestic rail nearest seller	
48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb. molybdenum content, mines	$1.60

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $75, Palmerton, Pa.; $75, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $185 per gross ton of alloy, c.l. packed, $197; gross ton lots, packed, $212; less gross ton lots, packed, $229; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Ashtabula, O. Base price: $187, Johnstown, Pa.; $185, Sheridan, Pa.; $188, Etna, Pa.; $190, Chattanooga, Tenn; $186, Anaconda, Mont.

Shipment from Pacific Coast warehouses by one seller, add $23 to above prices f.o.b. Los Angeles, Oakland, Portland, Oreg. Shipment from Chicago warehouse, ton lots $227; less gross ton lots, $244 f.o.b. Chicago. Add or subtract $2.30 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 25.75c per lb of contained Mn, carload packed 26.5c, ton lots 27.6c, less ton 28.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max. 7% Si. **Special Grade:** (Mn 90% min., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max.). Carload, lump, bulk 19.15c per lb of contained Mn, carload packed 19.9c, ton lot 21.0c, less ton 22.2c. Delivered. Spot, add 0.25c.

Manganese metal, 2" x D (Mn 96% min., Fe 2% max., Si 1% max., C 0.2% max.): Carload, lump, bulk, 34c per lb of metal; packed, 34.75c; ton lot 36.25c; less ton lot 38.25c. Delivered. Spot, add 2c.

Manganese Electrolytic: 40,000 lb or more, 28c; 2000 to 39,999 lb, 30c; 250 to 1999 lb, 32c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si 9.90c per lb of alloy, carload packed, 10.65c, ton lot 11.55c, less ton 12.55c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lot 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.). Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%.) Contract, $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max., C 0.4% max.). Contract, ton lot, 2" x D, $4.90 per lb of contained Cb, less ton $4.95. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min., C 0.30 max.) ton lots, 2" x D, $3.75 per lb of contained Cb plus Ta, deld.; less ton lots $3.80.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr, 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed, 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18c per lb of alloy; ton lots 19c; less ton lots 20.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 15c per lb of alloy; ton lots 16.50c; less ton lots 17.75c, f.o.b., Niagara Falls; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 14.50c, packed 15.50c; ton lots, packed, 15.25c; less ton lots, packed, 16.25c per lb of alloy, delivered to destination within United States.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, or Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth, $1.32; Washington, Pa., furnace, any quantity $1.32.

Technical Molybdic Oxide: Per lb, contained Mo, f.o.b. Langeloth $1.14, packed in bags containing 20 lb of molybdenum; Washington, Pa., $1.13.

NOTE: Current prices on chromium, silicon, vanadium, boron and tungsten alloys appeared on page 147, Oct. 1 issue; calcium, zirconium and briquetted alloys, page 269, Oct. 8. Refractories prices also were published on page 269, Oct. 8 issue.

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, as amended Apr. 19, 1951

STEELMAKING SCRAP COMPOSITE

Oct. 11	$44.00
Oct. 4	44.00
July 1951	44.00
Aug. 1950	40.00
Aug. 1946	19.17

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin; and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

No. 1 Heavy Melting Steel (Grade) 1

Basing Point	Dealer-Industrial	Railroad
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	43.00	45.00
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	41.15	43.15
Duluth, Minn.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.50	41.50
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	43.00	45.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Phoenixville, Pa.	42.50	44.50
Pittsburg, Calif.	35.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	35.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Sparrows Point, Md.	42.00	44.00
Steubenville, O.	44.00	46.00
Warren, O.	44.00	46.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton for other grades of dealer and industrial scrap:

O-H and Blast Furnace Grades

2. No. 2 Heavy Melting	—$2.00
3. No. 1 Busheling	Base
4. No. 1 Bundles	Base
5. No. 2 Bundles	— 3.00
6. Machine Shop Turnings	—10.00
7. Mixed Borings & Short Turnings	— 6.00
8. Shoveling Turnings	— 6.00
9. No. 2 Busheling	— 4.00
10. Cast Iron Borings	— 6.00

Elec. Furnace and Fdry. Grades

11. Billet, Bloom & Forge Crops	+ 7.50
12. Bar Crops & Plate	+ 5.00
13. Cast Steel	+ 5.00
14. Punchings & Plate Scrap	+ 2.50
15. Electric Furnace Bundles	+ 2.00
Cut Structurals & Plate:	
16. 3 feet and under	+ 3.00
17. 2 feet and under	+ 5.00
18. 1 foot and under	+ 6.00
19. Briquetted Cast Iron Borings	Base
Foundry, Steel:	
20. 2 feet and under	+ 2.00
21. 1 foot and under	+ 4.00
22. Springs and Crankshafts	+ 1.00
23. Alloy Free turnings	— 3.00
24. Heavy Turnings	— 1.00

Special Grades

25. Briquetted Turnings	Base
26. No. 1 Chemical Borings	— 3.00
27. No. 2 Chemical Borings	— 4.00
28. Wrought Iron	+10.00
29. Shafting	+10.00

Restrictions on Use

(1) Prices for Grades 11 and 23 may be charged only when shipped to a consumer directly from an industrial producer; otherwise ceiling prices shall not exceed prices established for Grades 12 and 8, respectively. (2) Prices established for Grades 26 and 27 may be charged only when sold for use for chemical or annealing purposes, and in the case of Grade 27, for briquetting and direct charge into an electric furnace; otherwise ceiling prices shall not exceed prices established for Grade 10. (3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price shall not exceed ceiling price for corresponding grade of basic open-hearth.

(4) Premiums for Grades 11-18, 20 and 21 may be charged only when sold for use in electric and open-hearth furnaces or foundries.

(5) Prices for Grade 29 may be charged only when sold for forging or rerolling purpose.

Special Pricing Provisions

(1) Sellers of Grades 26 and 27 may make an extra charge of $1.50 per ton for loading in box cars, of 75 cents per ton for covering gondola cars with a weather-resistant covering.

(2) Ceiling price of pit scrap, ladle scrap, salamander scrap, skulls, skimmings or scrap recovered from slag dumps and prepared to charging box size, shall be computed by deducting from the price of No. 1 heavy melting steel of dealer and industrial origin, the following amounts: Where iron content is 85% and over, $6; 75% and over, $10; less than 75%, $12.

(3) Ceiling price of any inferior grade of scrap not listed shall not exceed the price of No. 1 heavy melting steel less $15.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap.

2. No. 2 Heavy melting Steel	—$2.00
3. No. 2 Steel Wheels	Base
4. Hollow Bored Axles and loco. axles with keyways between the wheelseats	Base
5. No. 1 Busheling	— 3.50
6. No. 1 Turnings	— 3.00
7. No. 2 Turnings, Drillings & Borings	—12.00
8. No. 2 Cast Steel and uncut wheelcenters	— 6.00
9. Uncut Frogs, switches	Base
10. Flues, Tubes & Pipes	— 8.00
11. Structural, Wrought Iron and/or steel, uncut	— 6.00
12. Destroyed Steel Cars	— 8.00
13. No. 1 Sheet Scrap	— 9.50
14. Scrap Rails, Random Lengths	+ 2.00
15. Rerolling Rails	+ 7.00
Cut Rails:	
16. 3 feet and under	+ 5.00
17. 2 feet and under	+ 6.00
18. 18 inches and under	+ 8.00
19. Cast Steel, No. 1	+ 3.00
20. Uncut Tires	+ 2.00
21. Cut Tires	+ 5.00
Bolsters & Side Frames:	
22. Uncut	Base
23. Cut	+ 3.00
24. Angle, Splice Bars & Tie Plates	+ 5.00
25. Solid Steel Axles	+12.00
26. Steel Wheels, No. 3 oversize	Base
27. Steel Wheels, No. 3	+ 5.00
28. Spring Steel	+ 5.00
29. Couplers & Knuckles	+ 5.00
30. Wrought Iron	+ 8.00
31. Fireboxes	— 8.00
32. Boilers	— 6.00
33. No. 2 Sheet Scrap	—13.00
34. Carsides, Doors, Car Ends, cut apart	— 6.00

Restrictions on Use

(1) Price established for Grade 15 may be charged only when purchased and sold for rerolling uses; otherwise, ceiling shall not exceed that for Grade 14.

(2) Price established for Grade 30 may be charged only when sold to a producer of wrought iron; otherwise, ceiling shall not exceed that for No. 1 heavy melting steel.

(3) Price for Grade 25 may be charged only when sold for rerolling and forging purposes; otherwise ceiling shall not exceed that for base grade (No. 1.)

CAST IRON SCRAP

Ceiling price per gross ton for following grades shall be f.o.b. shipping point:

Cast Iron:	
1. No. 1 (Cupola)	$49.00
2. No. 2 (Charging Box)	47.00
3. No. 3 (Hvy. Breakable)	45.00
4. No. 4 (Burnt Cast)	41.00
5. Cast Iron Brake Shoes	41.00
6. Stove Plate	46.00
7. Clean Auto Cast	52.00
8. Unstripped Motor Blocks	43.00
9. Wheels, No. 1	47.00
10. Malleable	55.00
11. Drop Broken Machinery	52.00

Restrictions on Use

(1) Ceiling shipping point price which a basic open-hearth consumer may pay for No. 1 cast iron, clean auto cast, malleable or drop broken machinery cast shall be ceiling price for No. 3 cast iron.

(2) Ceiling shipping point price which any foundry other than a malleable iron producer may pay for Grade 10 shall be ceiling price for No. 1 cast iron.

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin authorized by OPS are:

(1) For preparing into Grades No. 1, No. 2 or No. 3, $8.

(2) For hydraulically compressing Grade No. 4, $6 per ton; Grade No. 5, $8.

(3) For crushing Grade No. 6, $3.

(4) For preparing into Grade No. 20, $6.

(5) For preparing into Grade No. 19, $6.

(6) For preparing into Grades No. 12, No. 13, No. 14, No. 16, or No. 26, $10.

(7) For preparing into Grade No. 17 or Grade No. 21, $11.

(8) For preparing into Grade No. 18 or Grade No. 20, $12.

(9) For hydraulically compressing Grade No. 15, $8.

(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of railroad origin shall be:

(1) For preparing into Grade No. 1 and Grade No. 2, $8.

(2) For hydraulically compressing Grade No. 13, $6.

(3) For preparing into Grade No. 16, $4.

(4) For preparing into Grade No. 17, $5.

(5) For preparing into Grade No. 21, $4.

(6) For preparing into Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron are limited to:

(1) For preparing Grade No. 8 into grade No. 7, $9.

(2) For preparing Grade No. 3 into Grade No. 11, $7.

(3) For preparing Grade No. 3 into Grade No. 1, $4.

Whenever scrap has arrived at its point of delivery and consumer engages a dealer to prepare such scrap, no fee may be charged for such services unless consumer obtains prior written OPS approval.

Commissions

No commission shall be payable to a broker in excess of $1.

Unprepared Scrap

For unprepared scrap, other than materials suitable for hydraulic compression, ceiling basing point prices shall be $8 per ton beneath ceiling of the prepared base grades.

For unprepared material which when compressed constitutes No. 1 bundles, ceiling basing point price shall be $6 per ton beneath ceiling for No. 1 bundles; or when compressed constitutes No. 2 bundles ceiling basing point price shall be $8 beneath ceiling basing point price for No. 2 bundles.

Premiums for Alloy Content

No premium may be charged for alloy content except: $1.25 per ton for each 0.25% of nickel where scrap contains not less than 1% and not over 5.25% nickel; $2 per ton for scrap containing not less than 0.15 per cent molybdenum and $3 for scrap containing not less than 0.65% molybdenum; for scrap containing not less than 10% manganese, $4 for scrap in sizes larger than 12 x 24 x 8 in., and $14 for scrap cut in that size or smaller (applicable only if scrap is sold for electric furnace uses or on NPA allocation); $1 for scrap conforming to SAE 52100.

Switching Charges

Switching charges to be deducted from basing point prices of dealer, industrial and nonoperating railroad scrap, to determine ceiling shipping point prices for scrap originating in basing points are per gross ton:

Alabama City, Ala., 43c; Ashland, Ky., 47c; Atlanta, 54c.

Bethlehem, Pa., 52c; Birmingham, 50c; Brackenridge, Pa., 53c; Buffalo, 83c; Butler, Pa., 65c.

Canton, O., 51c; Chicago (including Gary, Ind.), $1.34; Cincinnati (including Newport, Ky.), 65c; Claymont, Del. (including Chester, Pa.), 79c; Cleveland, 76c.

Coatesville, Pa., 59c; Conshohocken, Pa., 20c.

Detroit, 95c; Duluth, Minn., 50c.

Harrisburg, Pa., 51c; Houston, Tex., 57c.

Johnstown, Pa., 75c.

Kansas City, Mo., 73c; Kokomo, Ind., 51c.

Middletown, O., 26c; Midland, Pa., 73c; Minnequa, Colo., 33c; Monessen, Pa., 51c.

Phoenixville, Pa., 51c; Pittsburg, Calif., 65c; Pittsburgh (including Bessemer, Homestead, Duquesne, Munhall), 99c; Portland, Oreg., 52c; Portsmouth, O., 51c.

St. Louis (including Federal, Granite City, E. St. Louis, Madison, Ill.), 51c; San Francisco (including So. San Francisco, Niles, Oakland), 66c; Seattle, 59c; Sharon, Pa., 75c; Sparrows Point, Md., 20c; Steubenville, O., 51c.

Warren, Pa., 75c; Weirton, W. Va., 70c.

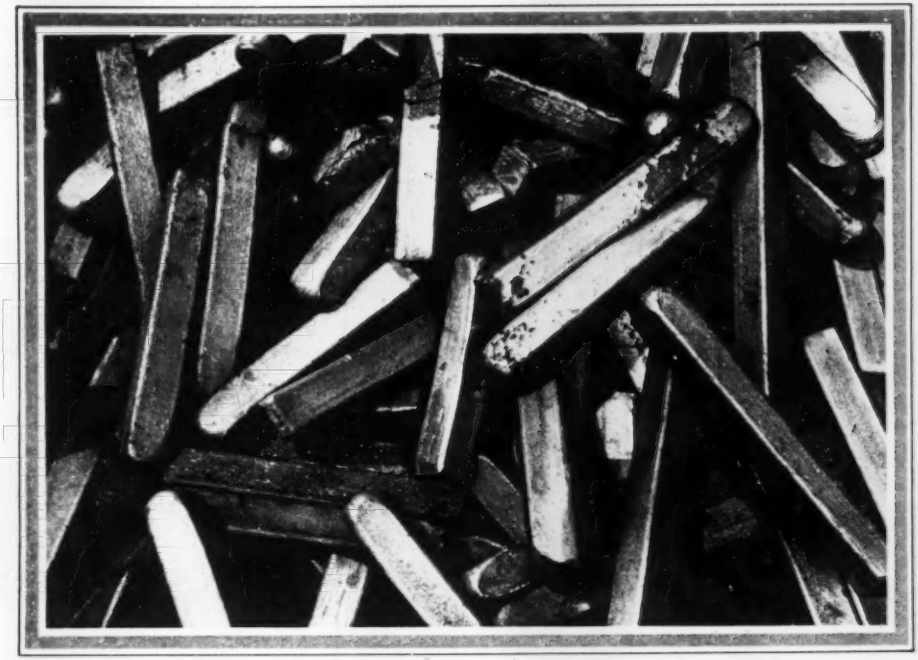
Youngstown, 75c.

HAMILTON, ONT.

(Delivered Prices)

Heavy Melt	$35.00
No. 1 Bundles	35.00
No. 2 Bundles	34.00
Mechanical Bundles	33.00
Mixed Steel Scrap	31.00
Mixed Borings, Turnings	28.00
Rails, Remelting	35.00
Rails, Rerolling	38.00
Bushelings	29.50
Bushelings new factory, prep'd.	33.00
Bushelings new factory, unprep'd.	28.00
Short Steel Turnings	28.00
Cast Iron Grades*	
No. 1 Machinery Cast	58.00-60.00

* F.o.b. shipping point.



billet, bloom & forge crops

use:

As the ingot is rolled down successively into blooms, billets, bars, etc., irregular ends must constantly be cut by a rotary flying shear. Cut lengths from mill rolling processes become a home scrap known as Billet, Bloom and Forge Crops. This scrap is then prepared in size to conform to the charging area of the electric furnace, providing a heavy, compact load. Since the analysis of these mill crops is generally known, it is a favored scrap grade for the electric furnace.

source:

Scrap resulting from rolling processes in Blooming mills, bar mills, plate mills, etc.

This is one of a series illustrating the many and varied types of scrap required in the making of iron and steel for every use. Our national organization, manned by personnel who is steeped in every phase of scrap knowledge, is ready to meet your every scrap problem.

specifications:

Billet, bloom and forge crops. Billet, bloom, axle, slab, heavy plate and heavy forge crops, not over 0.05% phosphorus or sulphur and not over 0.5% silicon, free from alloys. Must not be less than 2 inches in thickness, not over 18 inches in width and not over 36 inches in length. Must be new material delivered to the consumer directly from the industrial producer.

CONSULT OUR NEAREST OFFICE FOR THE PURCHASE AND SALE OF SCRAP

LURIA BROTHERS AND COMPANY, INC.

PLANTS

LEBANON, PENNA.
READING, PENNA.
DETROIT (ECORSE), MICHIGAN
MODENA, PENNA.
PITTSBURGH, PENNA.
ERIE, PENNA.

MAIN OFFICE

LINCOLN-LIBERTY BLDG.
Philadelphia 7, Penna.

OFFICES

BIRMINGHAM, ALA.
Empire Building

BOSTON, MASS.
Statler Building

BUFFALO, N. Y.
Genesee Building

CHICAGO, ILLINOIS
100 W. Monroe St.

CLEVELAND, OHIO
1022 Midland Bldg.

DETROIT, MICHIGAN
2011 Book Building

ST. LOUIS, MISSOURI
2052 Railway Exchange Bldg.

HOUSTON, TEXAS
1114 Texas Av. Bldg.

LEBANON, PENNA.
Luria Building

NEW YORK, N. Y.
100 Park Avenue

SAN FRANCISCO, CALIFORNIA
Pacific Gas & Elec. Co., Bldg.

PITTSBURGH, PA.
Oliver Building

PUEBLO, COLORADO
334 Colorado Bldg.

READING, PENNA.
Luria Building

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

every grade of ZINC

for urgent military and

civilian requirements

SLAB ZINC

PRIME WESTERN

SELECT

BRASS SPECIAL

INTERMEDIATE

HIGH GRADE

SPECIAL HIGH GRADE

AMERICAN ZINC SALES COMPANY

Distributors for

AMERICAN ZINC, LEAD & SMELTING COMPANY

Columbus, O. Chicago St. Louis New York

The Metal Market

Drop in lead and zinc imports and slowdown in scrap metal shipments, as a result of OPS price action, aggravate acute shortage of nonferrous metals

CURTAILMENT of operations at fabricating plants is becoming more widespread as the shortage of nonferrous metals worsens. The acute scarcity of metals has been aggravated by a series of developments over the last few weeks. Use of copper for consumer goods may be prohibited for some consumer goods and may be curtailed in others in first quarter.

Producers of copper, lead and zinc have been forced to reduce their shipments as a direct result of the recent strike of workers at mines and smelters. In zinc, for instance, production dropped from 78,955 tons in July to 74,035 in August and 70,623 in September. Concurrently, shipments dropped from 83,346 tons to 74,191 and 64,532. With shipments being restricted, smelters were able to lift their stocks to 17,235 tons at end of last month from 11,244 tons at end of August. They fell behind on filling orders, the backlog having risen to 66,838 tons.

Consumers are deprived, at least temporarily, of foreign-mined lead and zinc because they are prohibited from paying the higher prices being offered abroad. OPS placed a ceiling on imported metal at the domestic price level. The leading producer of Mexican lead is quoting 21.50c, f.a.s. Gulf ports compared to the ceiling here of 18.80c, St. Louis. For the first seven months of 1951, United States imports of Mexican refined lead averaged only 3000 tons a month compared with an average of 18,400 tons monthly in 1950.

Industry Confused—The action taken by OPS in respect to refined lead and zinc without similar action in scrap metal and fabricated products made from those metals has created confusion in the industry. Scrap lead is being withheld from the market and substantial tonnages would be released, trade authorities say, if an upward revision in prices were made. Scrap material accounts for about one-third of all the lead used in the United States.

Some producers of goods made from lead are curtailing shipments sharply pending clarification of the price picture. They point out that prices of lead products traditionally are based on prices paid for refined pig lead.

Interests in the copper trade are watching these developments closely, since OPS may take similar action in the case of copper. At present, ceiling on domestic copper is set at 24.50c, Valley, while 27.50c is allowed on imported copper. The brass mills already have been adversely affected by the rulings on lead and zinc, important raw materials in their operations.

Beginning Nov. 1, distributors and jobbers of copper wire mill products may use the allotment symbol "X6" for orders on mills equal to 100 per cent of the copper poundage of the products they shipped during the preceding month.

Tin Negotiations Continue

Tin price negotiations between this country and Bolivian producers are going forward with the parties making little progress toward reaching an agreement. The Bolivian producers, who usually supply the United States with about 40 per cent of its annual tin supply, desire a long-term contract on the basis of $1.50 a pound compared with $1.12 under the present 30-day contract. The RFC has not revealed what price it is willing to pay but says the asking price is "ridiculous."

More Aluminum in Sight

Aluminum will be diverted to industry from the military stockpile over the balance of this year to fill allotments of the metal in fourth quarter. The government may pursue the same policy in the first quarter of 1952, an official of the Munitions Board indicates.

Machinery now is being worked out by NPA for making available to industry the aluminum shunted from the stockpile. This action is necessary because of a loss of about 3000 tons of the metal as a result of the power shortage in the Pacific northwest where half the United States primary aluminum capacity is located. Improvement in the power situation recently, however, has postponed government action to ban use of aluminum in some 200 nonessential civilian items.

Aluminum fabricators recommended to NPA that 8000 tons of finished aircraft sheet, now held by mills on the government's account, be released during the fourth quarter to help meet allotments for aircraft production. This would result in an easing of the aircraft program's demand for aluminum over the balance of this year. At the same time, fabricators urged that present mill production schedules be left undisturbed.

Shortage of aluminum and government restrictions have caused Aluminum Co. of America to reduce operations in many of its fabricating plants. Also partly responsible for the "bleak outlook" in aluminum supply is the small amount of imported aluminum that will be available in the near future.

I. W. Wilson, president of Aluminum Co. of America, says that in 1950 a total of 353 million pounds of aluminum ingot was imported into the United States, but the quantity of foreign metal offered for sale in the American market in 1951 will be considerably less. Other nations need the metal, Mr. Wilson explained, for growing military requirements and that's the reason for the decline. Alcoa will feel this pinch particularly hard in the coming months since it was only through use of imported metal that the company was able to keep its fabricating plants operating at a satisfactory level during the past year.

American Zinc Buys Firm

American Zinc, Lead & Smelting Co., St. Louis, purchased the Nellie B Mining Co., consisting of about 1360 acres located in the Oklahoma section of the Tri-State lead and zinc district . Three concentrating plants are treating between 3000 and 4000 tons of zinc-lead ores per day. Operation of these properties at maximum capacity will be continued.

PRODUCTION IN JANUARY: Relief of the shortage of aluminum for national defense will be felt when this $80 million aluminum reduction plant is completed in Corpus Christi, Texas. The plant being built by Reynolds Metals Co. will produce 150 million pounds of aluminum pig a year with power supplied from an electric power plant at a capacity of 175,000 kw. The plant covers 435 acres and more than a million square feet of floor space will be under roof

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley; Lake 24.62½c, delivered.

Brass Ingots: 85-5-5-5 (No. 115) 27.25c; 88-10-2 (No. 215) 38.50c; 80-10-10 (No. 305) 32.25c; No. 1 yellow (No. 405) 23.25c.

Zinc: Prime western 19.50c; brass special 19.50c; intermediate 20.00c. East St. Louis; high grade 20.50c, delivered.

Lead: Common 18.80c; chemical 18.90c; corroding $8.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 19.60c; pigs 18.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb. c.l. orders.

Secondary Aluminum: Piston alloys 20.50c; No. 12 foundry alloy (No. 2 grade) 19.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 18.00c; grade 2, 17.75c; grade 3, 17.25c; grade 4, 16.50c.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 103.00.

Antimony: American 99-99.8% and over but not meeting specifications below 42.00c; 99.8% and over (arsenic 0.05% max.; other impurities 0.1% max.) 42.50c; f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 56.50c; 25-lb pigs, 59.15c; "XX" nickel shot, 60.15c; "F" nickel shot or ingots, for addition to cast iron, 56.50c.—Prices include import duty.

Mercury: Open market, spot, New York, $215-$221 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $1.56 per lb of alloy, f.o.b., Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2.55 del.; special or patented shapes $2.80.

Cobalt: 97.99% $2.10 per lb for 500 lb (kegs); $2.42 per lb for 100 lb (cases); $2.47 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York 90.00c per oz.

Platinum: $90-$93 per ounce from refineries.

Palladium: $24 per troy ounce.

Iridium: $200 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Ceiling prices, cents per pound, f.o.b. mill; effective Aug. 23, 1951)

Sheet: Copper 41.6%; yellow brass 38.28; commercial bronze, 95% 41.61; 90% 41.13; red brass, 85% 40.14; 80% 39.67; best quality, 39.15; nickel silver, 18% 53.14; phosphor-bronze grade A, 5% 61.07.

Rod: Copper, hot-rolled 37.53; cold-drawn 38.78; yellow brass free cutting, 32.63; commercial bronze, 95% 41.30; 90% 40.82; red brass 85% 39.83; 80% 39.36.

Seamless Tubing: Copper 41.72; yellow brass 41.29; commercial bronze, 90% 43.79; red brass, 85% 43.05.

Wire: Yellow brass 38.57; commercial bronze, 95% 41.90; 90% 41.42; red brass, 85%, 40.43; 80% 39.96; best quality brass, 39.44.

(Base prices, effective Nov. 6, 1950)

Copper Wire: Bare, soft, f.o.b. eastern mills, c.l. 28.67-30.42; l.c.l. 29.17-30.92; 100,000 lb lots 28.545-30.295; weatherproof, f.o.b. eastern mills, c.l. 29.60-30.60, l.c.l. 30.10-31.10, 100,000 lb lots 29.35-30.35; magnet, del., 15,000 lb or more 34.50c, l.c.l. 35.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders)

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range Inches	Widths or Diameters, In.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	30.1	....	....
0.135-0.096	12-48	30.6	....	....
0.095-0.077	12-48	31.2	29.1	33.2
0.076-0.061	12-48	31.8	29.3	33.4
0.060-0.048	12-48	32.1	29.5	33.7
0.047-0.038	12-48	32.5	29.8	34.0
0.037-0.030	12-48	32.9	30.2	34.6
0.029-0.024	12-48	33.4	30.5	35.0
0.023-0.019	12-36	34.0	31.1	35.7
0.018-0.017	12-36	34.7	31.7	36.6
0.016-0.015	12-36	35.5	32.4	37.6
0.014	12-24	36.5	33.3	38.9
0.013-0.012	12-24	37.4	34.0	39.7
0.011	12-24	38.4	35.0	41.2
0.010-0.0095	12-24	39.4	36.1	42.7
0.009-0.0085	12-24	40.6	37.2	44.4
0.008-0.0075	12-24	41.9	38.4	46.1
0.007	12-18	43.3	39.7	48.2
0.006	12-18	44.8	41.0	52.8

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or distance across flats	Round— R3/4T-T4,	R3/4T-T4	Hexagonal— R3/4T-T4	R7T-T4	R7S-T4
0.125	52.0	....	....	....	....
0.156-0.0188	44.0	....	....	....	....
0.219-0.313	41.5	....	....	....	....
0.375	40.0	46.0	48.0	....	....
0.406	40.0	....	....	....	....
0.438	40.0	46.0	48.0	....	....
0.469	40.0	....	....	....	....
0.500	40.0	46.0	48.0	....	....
0.531	40.0	....	....	....	....
0.563	40.0	....	....	45.0	....
0.594	40.0	....	....	....	....
0.625	40.0	43.5	45.0	....	....
0.688	40.0	....	....	45.0	....
0.750-1.000	39.0	41.0	42.5	....	....
1.063	39.0	....	....	41.0	....
1.125-1.500	37.5	39.5	41.0	....	....
1.563	37.0	....	....	....	....
1.625	36.5	....	....	39.5	....
1.688-2.000	36.5	....	....	....	....

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets: Full rolls, 140 sq ft or more $22.00 per cwt; add 50c cwt 10 sq ft to 140 sq ft. Pipe: Full coils $22.00 per cwt. Traps and bends: List prices plus 60%.

ZINC

Sheets, 24.50c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 23.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 23.50-24.50c; over 12-in., 23.50-24.50c.

"A" NICKEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled, 77.00c. Strip, cold-rolled, 83.00c. Rods and shapes, 73.00c. Plates, 75.00c. Seamless tubes, 106.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 60.50c. Strip, cold-rolled 63.50c. Rods and shapes, 58.50c. Plates, 59.50c. Seamless tubes, 93.50c. Shot and blocks, 53.50c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 41.00c.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

DAILY PRICE RECORD

1951	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Oct. 5-11	24.50	18.50	19.50	103.00	19.00	42.00	56.50	88.00
Oct. 4	24.50	18.80	19.50	103.00	19.00	42.00	56.50	84.75
Oct. 2-3	24.50	18.80	19.50	103.00	19.00	42.00	56.50	90.16
Oct. 1	24.50	18.80	17.50	103.00	19.00	42.00	56.50	90.16
Sept. Avg.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
Aug. Avg.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
July Avg.	24.50	16.80	17.50	106.00	19.00	42.00	56.50	90.16
June Avg.	24.50	16.80	17.50	117.962	19.00	42.00	56.50	88.492
May Avg.	24.50	16.80	17.50	139.923	19.00	42.00	56.50	90.16
Apr. Avg.	24.50	16.80	17.50	145.735	19.00	42.00	56.50	90.16
Mar. Avg.	24.50	16.80	17.50	145.730	19.00	42.00	56.50	90.16

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked. Silver, open market, New York. Prices, cents per pound, except silver, cents per ounce.

Plating Materials

Chromic Acid: 99.9% flakes, f.o.b. Philadelphia, carloads, 27.00c; 5 tons and over 27.50c; 1 to 5 tons, 28.00c; less than 1 ton 28.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat, rolled, 38.34c; oval 37.84c.

Nickel Anodes: Rolled oval, carbonized, carloads, 74.50c; 10,000 to 30,000 lb, 75.50c; 3000 to 10,000 lb, 76.50c, 500 to 3000 lb 77.50c; 100 to 500 lb, 79.50c; under 100 lb, 82.50c; f.o.b. Cleveland.

Nickel Chloride: 36.50c in 100 lb bags; 34.50c in lots of 400 lb through 10,000 lb; 34.00c over 10,000 lb, f.o.b. Cleveland, freight allowed on 400 lb or more.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 77.7c; 100 or 350 lb drums only, 100 to 600 lb, 63.1c; 700 to 1900 lb 60.6c; 2000 to 9900 lb, 58.9c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Tin Anodes: Bar, 1000 lb and over, $1.19; 500 to 999 lb, $1.195; 200 to 499 lb, $1.20; less than 200 lb, $1.215. Freight allowed east of Mississippi and north of Ohio and Potomac.

Zinc Cyanide: 100 lb drums, less than 10 drums 47.7c, 10 or more drums, 45.7c, f.o.b. Niagara Falls, N. Y.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb $1.0009; more than 2000 lb, 98.09c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Stannous Chloride (Anhydrous): In 400 lb bbl, 87.23c; 100 lb kegs 88.23c. Freight allowed.

Scrap Metals

Brass Mill Allowances

Ceiling prices in cents per pound for less than 20,000 lb, f.o.b. shipping point, effective June 26, 1951.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.50	21.50	20.75
Yellow Brass	19.125	18.875	17.875
Commercial Bronze			
95%	20.50	20.25	19.75
90%	20.50	20.25	19.75
Red Brass			
85%	20.25	20.00	19.625
80%	20.125	19.875	19.375
Muntz metal	18.125	17.875	17.375
Nickel silver, 10%	21.50	21.25	19.75
Phos. bronze, 5%	25.25	25.00	24.00

Copper Scrap Ceiling Prices

(Base prices, cents per pound, less than 40,000 lb f.o.b. point of shipment)

Group I: No. 1 copper 19.25; No. 2 copper wire and mixed heavy 17.75; light copper 16.50; No. 1 borings 19.25; No. 2 borings 17.75; refinery brass, 17.00 per lb of dry Cu content, for 50 to 60 per cent material and 17.25 per lb for over 60 per cent material.

Group II: No. 1 soft red brass solids 19.50; No. 1 composition borings 19.25 per lb of Cu content plus 83 cents per lb of tin content; mixed brass borings 19.25 per pound of Cu content plus 78 cents per lb of tin content; unlined red car boxes 19.25; lined red car boxes 18.25; cocks and faucets 16.75; mixed brass screens 16.00; zincy bronze solids and borings 16.25.

Zinc Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment)

Unsweated zinc dross, 12.25c; new clippings and trimmings, 14.50c; engravers' and lithographers' plates, 14.50c; die cast slabs, min. 90% zinc, 12.25c; old zinc scrap, 11.25c; forming and stamping dies, 11.25c; new die cast scrap, 10.75c; old zinc die cast radiator grills, 10.50c; old die cast scrap, 9.50c.

Lead Scrap Ceiling Prices

(F.o.b. point of shipment)

Battery lead plates, 17.00c per lb of lead and antimony content, less smelting charge of 2 cents per lb of material in lots 15,000 lb or more; less 2.25c in lots less than 15,000 lb. Used storage batteries (in boxes) drained of liquid, 6.60c for 15,000 lb or more; 6.40c for less than 15,000 lb. Soft lead scrap, hard lead scrap, battery slugs, cable lead scrap or lead content of lead-covered cable scrap, 15.25c per lb. In addition, brokerage commissions are permitted.

Aluminum Scrap Ceiling Prices

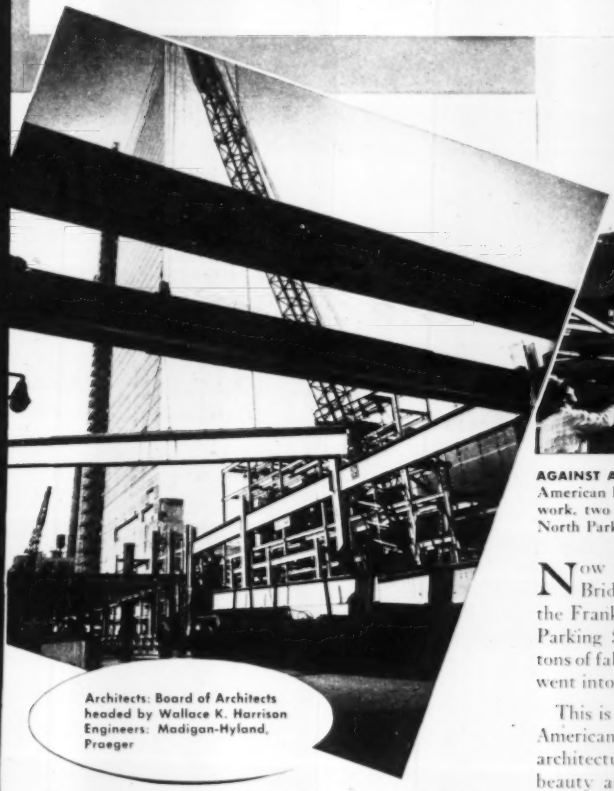
(Cents per pound, f.o.b. point of shipment, less than 5000 lb)

Segregated plant scrap: 2s solids, copper free, 16.00; high grade borings and turnings, 8.50; No. 12 piston borings and turnings, 7.50. Mixed plant scrap: Copper-free solids, 10.00 dural type, 9.00; Obsolete scrap: Pure old cable, 10.00; sheet and sheet utensils, 7.25; old castings and forgings, 7.75; clean pistons, free of struts, 7.75; pistons with struts, 5.75.

3 new structures for the United Nations

... fabricated and erected by the

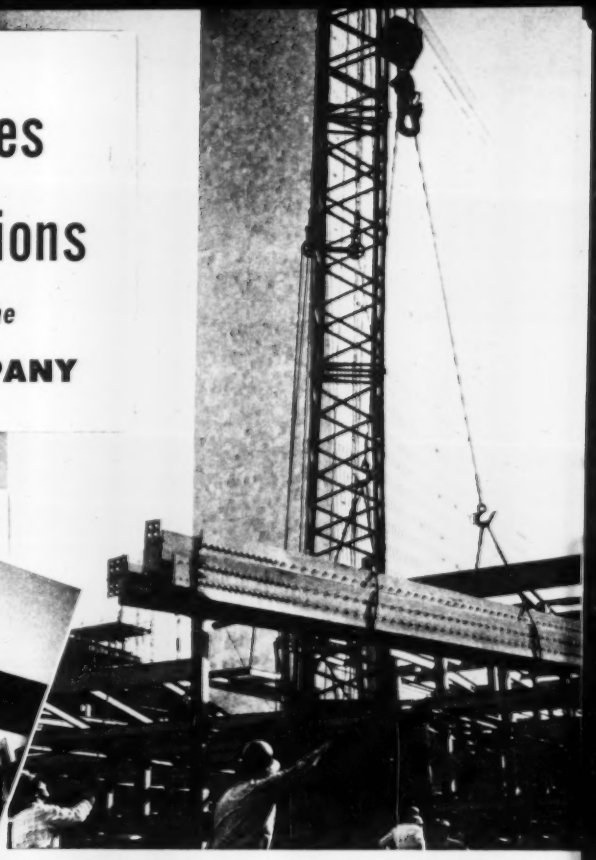
AMERICAN BRIDGE COMPANY



Architects: Board of Architects headed by Wallace K. Harrison
Engineers: Madigan-Hyland, Praeger

AMERICAN BRIDGE BEGINS erection of the steel framework for the cover of the Franklin D. Roosevelt Drive at the UN Headquarters. Eventually the entire drive from 42nd St. to 48th St. at East River will be covered. In the right foreground steel framework for the Meeting Halls Building can be seen. When completed, this building will extend, by cantilever construction, over the drive to the edge of the river.

AVAILABLE NOW! *For showing in churches, schools, clubs, and industries, the new sound and color motion picture—BUILDING FOR THE NATIONS—a candid, factual photographic record of the highlights of the fabrication and erection of the United Nations' Secretariat Building in New York City.*



AGAINST A BACKGROUND of the completed UN Secretariat Building, for which American Bridge Company fabricated and erected 13,800 tons of structural steel, work, two bridgemen direct the unloading of steel columns and beams for the North Parking Space at the UN site.

Now that the U N Secretariat Building is completed, American Bridge is erecting the Meeting Halls Building and cover for the Franklin D. Roosevelt Drive, General Assembly Hall and North Parking Space. When finished these structures will contain 18,600 tons of fabricated steel framework, in addition to the 13,800 tons which went into the Secretariat Building.

This is typical of how the time-tested and proved experience of the American Bridge Company has been linked to the latest in modern architectural and engineering design to create structures of unusual beauty and enduring strength. Hundreds of steel framed buildings all over the country are proof that for sturdy, economical structural work you can't beat rigid steel construction—and for varied experience ... unexcelled facilities ... trained personnel, you can't go wrong when you depend on American Bridge.

AMERICAN BRIDGE COMPANY
General Offices: Frick Building, Pittsburgh, Pa.

Contracting Offices in: AMBRIDGE · BALTIMORE · BOSTON · CHICAGO · CINCINNATI · CLEVELAND · DENVER · DETROIT · DULUTH · ELMIRA · GARY · MINNEAPOLIS · NEW YORK · PHILADELPHIA · PITTSBURGH · PORTLAND, ORE. · ST. LOUIS · SAN FRANCISCO · TRENTON
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS TRADE MARK

AMERICAN BRIDGE

UNITED STATES STEEL

OK
FOR MILITARY PRODUCTION

USE HOUGHTON
HOUGHTO-CLEAN 313-A

FAST-ACTING METAL CLEANER

For Government Specification 57-0-2C

Type II . . . Class C

HOUGHTO-CLEAN 313-A prepares metals for finishing *as it cleans*. Removes soil, oils, compounds and other coatings swiftly. Leaves a light, tough film on metals that provides extra adhesion for paint, lacquer and other finishes. This film also resists corrosion if finish is scratched or broken. You need no special tank or equipment to use Houghto-Clean 313-A. Order a drum of this economical metal cleaner from the Houghton Man or write to E. F. Houghton & Co., Philadelphia 33, Pa.

Latest data sheet mailed promptly on request.

HOUGHTO-CLEAN 313-A
. . . a product of
E. F. HOUGHTON & CO.
PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO
Ready to give you on-the-job service . . .

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 143

Boston—Concrete reinforcing bar distributors are sold far ahead with orders in excess of fabricated structural steel supply. For housing, hospitals and industrial expansion close to 5000 tons have been placed. Volume of unplaced bridge tonnage is down to lowest point in months.

Seattle—Rolling mills maintain operations at full capacity. Order backlogs extend well into next year. Output is roughly 75 per cent reinforcing and 25 per cent merchant bars. Small tonnages are accepted only if they can be worked into current schedules.

Los Angeles—Already fighting shortages of reinforcing bar and mesh, fabricators ponder how to handle the $9 billion worth of military construction pending in California. Average price for deformed bars in place is $11 per 100 pounds up $2 in last six months.

Sheets, Strip . . .

Sheet and Strip Prices, Page 143 & 144

Cleveland—Amount of tonnage that will be freed this quarter to care for unplaced CMP tickets as result of the NPA's recent ruling concerning third quarter carryover is uncertain. So far cancellations have been few, and since the initiative for wiping out duplicate tonnage remains with the consumers, the mills are continuing to ship as usual until ordered otherwise by customers. Indications are it will be pretty well on toward the middle of the quarter before any open spaces in rolling schedules appear.

Currently, demand is as strong as ever though pressure from some of the consumer durable goods manufacturers is off somewhat. On the other hand, demand from certain manufacturers is reported increasing after a period of relative quiescence.

Indications are galvanized sheet prices will be advanced to reflect the increase in zinc price in line with the pricing formula in effect with the various producers. Ordinarily, the increase is automatic in step with the rise in zinc, the addition to price being more or less in the form of a variable extra. However, under government price control there is some question whether such automatic action is permissible without specific OPS approval. Consequently, pending determination of policy definite price action is reportedly delayed by some sellers.

Pittsburgh—Producers of sheets and strip are trying to determine who has unplaced certified CMP tickets for fourth quarter, and the tonnage involved in such. Great uncertainty is evident in the trade as to the import of NPA's recent order making all carryover third quarter tonnage unshipped by Oct. 7 chargeable by consumers against their fourth quarter allotments. Cancellations to date have been slight. Thus the mills are as much in the dark as ever as to what space, if any, in rolling schedules will be opened up to care for the substantial CMP tonnage still reported unplaced for the period. Responsibility for cancelling tonnage remains with the customer since producers have no way of determining what tonnage on their books is duplicate. Currently, the rising price of zinc is directing increasing attention of the trade to galvanized sheets. Expectations are prices on galvanized products will be upped to offset the higher coating charges. However, the leading producer here has not announced definite policy as yet.

Chicago—Sheetmakers are not receiving cancellations of duplicated tonnage or overage of consumers' actual allotments. NPA believes there should be considerable of both types of withdrawals showing up and only explanation for its absence is that users may be delaying action until later in third quarter. Many consumers were caught short by NPA's ruling that third quarter tonnage shipped by mills after Oct. 7 must apply to fourth quarter allotments. Some mills had little carryover.

Cincinnati—Extent of rearrangement of sheet mill schedules, as a result of recent NPA directives, is undetermined. Cancellations continue ineffective in bringing an easier supply. Demand for positions on first quarter schedules is active.

Boston—Galvanized sheet consumers are being advised to accept painted or substitute coatings to avoid cancellations. Shortage of zinc for galvanizing is more critical. Pressure for carbon sheets and strip is easing. Galvanized excepted, demand for flat-rolled specialties is off, partly due to inventory regulations and under-capacity consumption. Considerable fourth quarter volume will extend into first quarter.

Philadelphia—Some manufacturers of consumer durable goods are not pressing for sheets. This is particularly true of stovemakers and manufacturers of sanitaryware. However, certain other lines, including television, are more active, building stocks of finished goods for the holiday trade. In general, sheet demand continues strong.

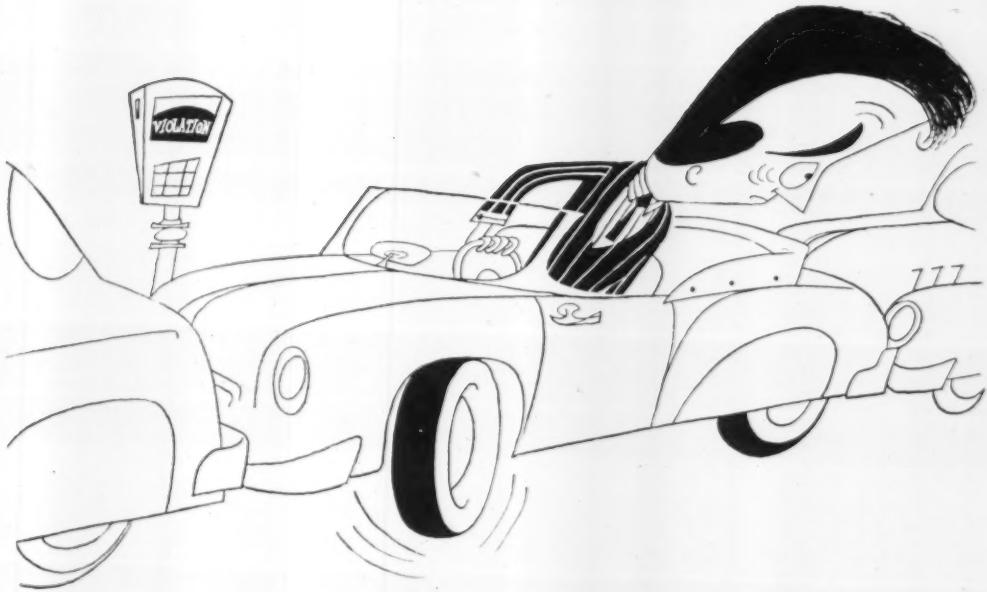
Tin Plate . . .

Tin Plate Prices, Page 144

Chicago—NPA's recent order requiring third quarter steel tonnage shipped after Oct. 7 be applied against fourth quarter allotments created much consternation among tin plate consumers. In case of this product it is recognized practice for producers to stock plate for shipment at such time as customer may direct. It is understood that NPA is preparing to amend its order so as to make tin plate an exception. It also develops that tin plate consumers hold allotment tickets in excess of needs. Limitation orders on use of tin plate are operating to reduce demand for many fabricated items such as cans, containers and closures.

Boston—Offers from stock lists for the first time in many months are made by at least one tin plate producer. Both hot dipped and electrolytic plate are included.

Pittsburgh—There was little carryover tonnage from third quarter. Consequently the tonnage affected by the NPA regulation ordering consumers to charge third quarter carryover unshipped by Oct. 7 to their fourth quarter allotments is small. No dif-



up against it for steel?

Our 23 warehouses are doing their best to supply from stock your special purpose steel requirements. While many steels are in short supply, many of our more than 400 specialty steels are *immediately* available . . . especially tool steels . . . from the Crucible warehouse in your area. Our mills are producing around the clock to maintain a good supply of vital steels for warehouse stocks—that's why you can be sure that nowhere else can you find a more complete stock than at your Crucible warehouse.

Phone in your request. Perhaps our warehouse people can offer you help when production schedules are tight and you need steel in a hurry.

Stocks maintained of:

Rex High Speed Steel . . . ALL grades of Tool Steel (including Die Casting and Plastic Die Steel, Drill Rod, Tool Bits and Hollow Drill Steel) . . . Stainless Steel (Sheets, Bars, Wire, Billets, Electrodes) . . . AISI Alloy, Machinery, Onyx Spring and Special Purpose Steels.

CRUCIBLE first name in special purpose steels

51 years of Fine steelmaking **WAREHOUSE SERVICE**

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

Branch Offices and Warehouses: ATLANTA • BALTIMORE • BOSTON • BUFFALO • CHARLOTTE • CHICAGO • CINCINNATI • CLEVELAND DENVER • DETROIT • HOUSTON • INDIANAPOLIS • LOS ANGELES • MILWAUKEE • NEWARK • NEW HAVEN • NEW YORK • PHILADELPHIA • PITTSBURGH PROVIDENCE • ROCKFORD • SAN FRANCISCO • SEATTLE • SPRINGFIELD, MASS. • ST. LOUIS • SYRACUSE • TORONTO, ONT. • WASHINGTON, D. C.

When you need
RUSH SERVICE
ON
HEAVY INDUSTRIAL GEARS

SIMONDS is geared to serve you *fast* on all large and heavy-duty industrial gear requirements. You get personalized attention, with accuracy and quality assured by nearly 60 years of specialized experience. SIMONDS' central location assures prompt delivery on all types and sizes, up to 145" in dia. and including cast or forged steel, gray iron, bronze, Meehanite, rawhide and bakelite. SIMONDS also is stock carrying distributor for Ramsey Silent Chain Drives and Couplings, and industrial V-Belts.

Call SIMONDS First!

SIMONDS GEARS
THE SIMONDS GEAR & MFG. CO.
LIBERTY at 25TH PITTSBURGH 22, PA.

ficulty is expected by the mills in adjusting schedules for fourth quarter in event some cancellations come in. Supplies appear adequate for all fourth quarter tickets outstanding. In fact, tin plate sales executives here report that so far as they are aware few CMP tickets for last quarter remain unplaced. Last week the National Production Authority emphasized that packers of canned goods may use either 1949 or 1950 as base period in determining the number of cans they are permitted to use in packing a specific product.

Plates . . .

Plate Prices, Page 143

New York—Plate demand continues heavy. Consumers are unable to place further tonnage with mills for the fourth quarter, even where they have the necessary certificates. The mills have had few openings as a result of cancellations. While this picture may change to some extent over the next week or so, consumers are not too hopeful that they will be provided with much in the way of relief. Mills are taking on more orders for first quarter, but are accepting little or nothing for shipment beyond except in the case of specially rated business.

Boston—Orders for first quarter, held to top-rated volume by most producers, are heavier and open capacity is narrowing. Allotments to some plate fabricators, weldment shops included, are not sufficient to meet planned production schedules through this quarter, and appeals for supplemental tonnage are pending. Seasonal decline in underground tank demand has not materialized and large expansions in fuel storage systems at airfields and other government installations will boost tank requirements. Bath Iron Works, Bath, Me., with contracts for two landing ship tanks, has booked three additional, and is the leading yard in the program for construction of 13 vessels of this type.

Philadelphia—Plate producers are making few changes in their fourth quarter schedules as cancellations are light. Meanwhile, they are having to turn down considerable tonnage from consumers who still hold unplaced CMP tickets. The large program of the Gulf Refining Co. for this district is beginning to stir, with William Kellogg & Co. and Foster Wheeler & Co., New York, awarded contracts for cracking and topping units.

Pittsburgh—Consumers' order cancellations were light up to last midweek, and there appears little chance much tonnage will be made available for unplaced certified fourth quarter CMP tickets. Confusion is reported by both the mills and buyers over NPA's order charging third quarter carryover after Oct. 7 to consumers' fourth quarter allotments. Complaint continues to be heard from fabricators of inability to get all the steel they can use. However, in the main, shipments are being received steadily. One large fabricator in this district, Pittsburgh-Des Moines Steel Co. currently is hampered by a strike, now in its second week. Some 150 workers are reported affected.

Los Angeles—With 1 inch plate unobtainable, fabricators are grinding down hot-rolled plate which is in better supply.

Tubular Goods . . .

Tubular Goods Prices, Page 147

Cleveland—Uncertainty exists in the pipe market here as to whether recently announced increases of $1 to $4 per ton on galvanized pipe are firm. This stems from the fact government price control puts pricing in a different light and throws some question around normal pricing practices. At any rate, pending definite determination of policy in conformity with Office of Price Stabilization reaction, some producers are inclined to move cautiously. Normally, price changes in galvanized items, such as pipe, sheets and wire are effected more or less automatically to reflect increases or decreases in zinc. However, there appears to be some question whether OPS approves such practice though it has been standard practice in the past, in the case of sheets, for example, the increase being considered as a standard extra.

Boston—Merchant pipe distributors are taking full allotments and there is some trading among them for wanted sizes. Utilities take any tonnage not moving. For large construction projects competition for pipe is sharper.

Most producers are sold through remainder of this year on smaller electric welded sizes, three inch and under. Galvanized pipe has been advanced tentatively up to $4 per ton.

Pittsburgh—Several producers have posted price advances of $1 to $4 per ton on galvanized pipe to compensate for higher zinc costs, but National Tube Co., U. S. Steel subsidiary, has taken no action as yet. It is understood, however, the matter is under study and a policy announcement, likely applying to all galvanized coated products, will be forthcoming shortly.

Steel Bars . . .

Bar Prices, Page 143

Pittsburgh—Pending further developments, bar producers are continuing to ship against third quarter commitments carried over into the present period. Since responsibility remains with the customer for cancelling tonnage under NPA's latest order directing third quarter carryover unshipped after Oct. 7 be charged to consumers' fourth quarter allotments, the producers are going ahead as usual on rollings until instructed otherwise by buyers. So far cancellations have been few and far between so that there is no telling how much space will be opened in fourth quarter schedules to care for unplaced CMP tickets for that period. Expectations are cancellations, if any, are not likely to appear much before November. Of all the hot-rolled products, bars currently are in tightest supply. Any surplus resulting from order cancellations will be quickly taken up by unsatisfied CMP ticket holders. At the moment the situation in alloy bars appears to be tightening further. Bookings beyond first quarter are limited except for military work.

Boston—On bessemer bars some producers are able to liberalize distribution to a limited extent. With the warehouse allocation order official, mills delaying first quarter commitments on carbon bars are now scheduling tonnage in more volume. Direct

armament contracts are building up both carbon and alloy bar demand on a broader base, for broaching stock to rifle blanks with heaviest demand for forging material and bolts. Carryovers to apply against first quarter allotments will be substantial.

New York—Bar consumers will be advised by Washington shortly as to what their first quarter allotments will be under CMP. Their applications were scheduled to be in by Oct. 1. Most buyers have placed a substantial portion of their requirements (up to 70 per cent of fourth quarter allotments) where they have been able to find takers. Mills have opened their first quarter books, but are moving slowly in accepting new orders until they can get a better picture as to what they will be called up to supply.

Philadelphia—Cold-drawn bar producers are beginning to open books for second quarter. Some are at least entering orders for April. Hot carbon bar sellers are still confining acceptances to no later than first quarter and are even booking cautiously for that period.

Cleveland—So far as the bar mills are concerned cancellation of duplicate tonnage on books, ordered by NPA, will mean little so far as the order load for fourth quarter is concerned. To date there have been few cancellations. But even though substantial tonnage is cancelled out over coming weeks, there is more than enough unplaced CMP tonnage before the market to promptly fill any gaps which may be opened in fourth quarter rolling schedules.

Structural Shapes . . .

Structural Shape Prices, Page 143

Pittsburgh—Producers see no early improvement in structural supply. Contractors and fabricators are rapping at mill doors but are having little success in meeting their needs. Most producers' output is currently going to defense projects. Last month over $500 million of new construction applications were refused by NPA in an effort to save critical defense metals. It is allowing only 158 non-defense projects to proceed during fourth quarter. The agency is permitting builders of printing, duplication and publishing establishments and lumber and forestry facilities to certify their own needs for increased amounts of steel, copper and aluminum. These builders, which have been reclassified as "industrial," can place orders for up to 25 tons of steel, 2000 pounds of copper and 1000 pounds of aluminum for each such project annually. Heretofore they could only certify orders for 2 tons of steel, 200 pounds of copper and no aluminum.

Large contracts for Bailey type basic bridges were placed by Corps of Engineers, Pittsburgh district. Awards in excess of $250,000 each go to Decatur Iron & Steel Co., Decatur, Ala.; Ceco Steel Products Corp., Chicago; Steelcraft Mfg. Co., Rossmoyne, O., and Marinette Marine Corp., Marinette, Wis.

Boston—Tightening regulations and overloaded structural mill schedules are restricting new inquiry below top-rated requirements. Public work projects have been reviewed and deferred in some districts while others are redesigned for reinforced concrete construction.

New York—Following a recent flurry, structural awards again are light. In view of uncertainty as to the availability of supplies and as to cost, builders are moving cautiously even where there is a reasonable expectation that the projects will be given government approval.

Philadelphia—Although confined largely to miscellaneous industrial work and bridge construction, structural demand has taken a slight turn for the better. Fabricators, however, are concerned about steel supply, especially for the closing weeks of the year.

Chicago—Structural shape producers feel that NPA is not realistic in its handling of requirements. The agency claims that requirements for fourth quarter are 223 per cent of anticipated production. Mills ascertain through customer contacts that much of the material which NPA has put in fourth quarter schedules actually is not needed for fabrication for months to come. This applies even to some military needs.

Seattle—Fabricators, with heavy forward bookings, are bidding only on jobs which can be handled within available supplies. Shortages of certain items, particularly plates, are an obstacle. Strong demand continues for small tonnage jobs.

Wire . . .

Wire Prices, Page 145

Boston—Allotment tickets for wire products for first quarter are more realistic. Heading wire for screws and other fastenings is an exception. There is no appreciable volume of cancellations or deferments and unshipped volume against allotments this quarter will not be unduly heavy. Aircraft procurement continues to lag. The bed spring industry took a substantial cut in allocations for fourth quarter and more consumers have reached regulatory limits on inventory. Demand for nails is heavy, but distributors are in better shape to meet orders except for galvanized roofing nails.

Semifinished Steel . . .

Semifinished Prices, Page 143

Erie, Pa.—Erie Forge Co., has reactivated open hearth furnace No. 5. This is the second 100-ton unit placed in operation in the last three months. It will produce carbon and alloy steel ingots. The two furnaces will add 140,000 tons of steel ingots a year to the plant's production.

SYKES Sets Cargo Records

Chicago—Inland Steel Co.'s *S. S. Wilfred Sykes* has clinched a Great Lakes shipping record for its full season of operations. With two months remaining before ice ties up the ore fleet, the big vessel has completed 33 trips between Chicago and Lake Superior ports, the equivalent of a full season for slower boats. Its average load a trip has been 19,876 gross tons, a figure exceeding single cargo records of any other ship ever plying the lakes.

The *Sykes* established a new cargo record of 20,779 tons on a trip completed Oct. 3, the tenth new record for the ship. For the season to date, the *Sykes* has floated 655,930 tons. Unusually high water levels in the lakes this summer have enabled the heavier loadings.

Big stockpile of ore at steel mills for the winter months are imperative this year, says Philip D. Block Jr., Inland vice president. In order to maintain over-capacity operations in the face of a scrap shortage that threatens to grow worse in the winter months, the mills will consume more than their usual ratio of pig iron which is made from the ore brought down the lakes for the blast furnaces.

Pig Iron . . .

Pig Iron Prices, Page 142

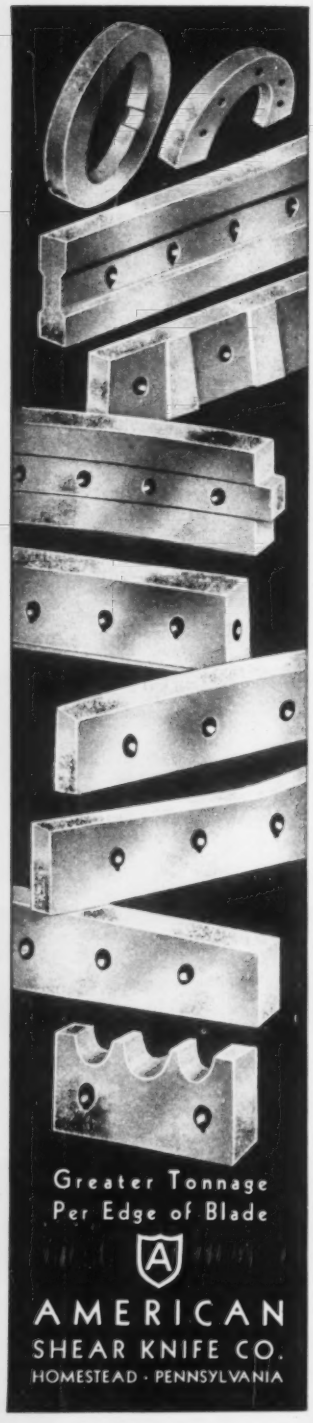
New York—Nothwithstanding a continued lag in gray iron castings demand, foundries continue to press for domestic iron. Few have anything like 30 days inventory permitted by National Production Authority and are anxious to build up their stocks. Most foundries would like to improve their mix by increasing their pig iron charge. Due to the upward trend in foreign iron prices, little interest is being manifested in this material. Imports of foreign iron this year are expected to set a new record, amounting possibly to between 900,000 and 1 million tons as against 795,965 tons last year. Arrivals for the first half of this year amounted to 597,233 net tons, against 177,027 tons in the corresponding period of 1950.

Domestic pig iron capacity this year, may increase 1 million tons to a total of around 73,100,000 tons, due primarily to the revamping and improving of existing facilities and to the likely blowing in shortly of a new furnace by the Woodward Iron Co., Woodward, Ala. This new Woodward iron will be comprised mostly of foundry grades and shops in this district are hopeful that some of it will be shipped north.

Philadelphia—While some gray iron foundries report a lag in business due to a spotty situation in consumer durables and delay in defense work taking up the slack, there is a general active demand for pig iron. In fact, requests for tonnage are in excess of supply.

Approximately 4000 tons of iron ore were aboard the *Southern Isles* which recently broke in half and sank in a storm about 230 miles off Charleston, S. C. The ore was being brought up from Puerto Rico, destined for Barium Steel Corp.'s subsidiary, Chester Blast Furnace, Inc., Chester, Pa.

Pittsburgh—Increasing defense demand for castings is beginning to take up the slack in foundry activities resulting from cutbacks in civilian durable goods. As a result, pressure for merchant pig iron is somewhat stronger than it was in the summer when foundry schedules were down as result of vacations and production curtailments. Supplies of merchant iron are adequate to support current foundry melting schedules but the foundries are unable to build inventories to any appreciable extent. Merchant iron sellers here are in receipt of tonnage inquiries



from outside the immediate consuming district but these inquiries stand little chance of being satisfied. Blast furnace operations in the district are unchanged with 53 out of 54 stacks blowing. Duquesne No. 4 blast furnace currently is down for repairs, having been blown out Sept. 24.

Cleveland—Expanding defense requirements for castings is resulting in some quickening of pressure on merchant iron sellers for tonnage. However, with output fully committed there is little possibility foundries can add to stocks. In fact, supply conditions in this area are tighter than they were a few months back, one district furnace ordinarily on merchant iron being out of production for repairs. Another district stack on basic iron also is down for repairs leaving seven out of nine local stacks in blast.

Republic Steel Corp. last week reported its No. 5 blast furnace here set a new production record in September. This stack turned out 48,005 tons in the month, a rate of 1600 tons daily, or 1.1 tons per minute. Expressed capacity of the furnace when it was constructed was 1250 tons daily. This stack is operated by the high-top pressure technique. A duplicate of No. 5 furnace is under construction here by Republic and is expected to be placed in production in January.

Chicago—Pig iron is in better balance with demand than it has been for some time. In the first place, melting requirements are dropping as result of reduced castings order from consumers goods industries. In second place, iron production in this district is at capacity for the first time in about six months. All 42 blast furnaces here are operating. Next few months however are expected to see an upturn in castings demand and some loss in iron output.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 147

Pittsburgh—Market is unchanged with demand steady for the better grades. Little beehive foundry is moving here. Poorer grades are going begging as many consumers have been "burned" too often by the higher-ash cats and dogs. It looks like plenty of market for all the high grade product. Prices are unchanged.

Scrap . . .

Scrap Prices, Page 150

Philadelphia—Pennsylvania Railroad has produced nearly $1\frac{1}{2}$ tons of iron and steel scrap for every ton of steel it has consumed since the first of 1945. Its contribution has averaged about three times the scrap required to make the steel it has used. During the period, the road turned back to the mills and foundries 3,367,404 net tons of iron and steel scrap. In the same period, the road placed on the market 37,352,400 pounds of nonferrous scrap.

During the 12 months ended July 31, covering about the first year of the Korean War, 554,613 tons of iron and steel scrap were turned in. Although the road accelerated its use of steel during that period, the scrap tonnage represented somewhat more than the tonnage of new steel consumed.

In 1950 the steel mills and foundries purchased 29,402,000 gross tons of scrap, of which the railroads furnished 4 million tons, or 14.6 per cent. Of the railroad contribution, the Pennsylvania, which represents about 10 per cent of the railroad industry, furnished 586,000 tons, or 14.7 per cent.

Philadelphia—While attention is focused on the scrap drives, many trade leaders say the government itself holds the principal keys to the situation. They believe, (1) the government should act promptly to establish a single price for the major open hearth grades, possibly at the No. 1 heavy melting steel level; (2) there should be a clarification as to water rates, with definite listing of points where water rates are permissible; (3) that steel foundry grades should be subject to allocations only.

Scrap inventories at district mills continue to decline. One producer last week was down to one day's supply. Allocations have been issued but are affording only moderate relief. Consumers say that much steel scrap in district yards is being prepared to meet foundry steel specifications, and is moving westward at premiums of $2 and $4 per ton over No. 1 heavy melting steel.

Boston—Scrap drive is getting under way with slight improvement in deliveries through regular channels. Tonnage is not yet sufficient to bolster low mill inventories of steel scrap. Railroads are combing sources with most scrap obtained allocated. New Haven railroad moved 3500 tons in September. Some steel scrap is coming into this area from outside and the ratio of bundles shipped is somewhat above normal. Cast is slightly more active, but some grades have been bought below ceilings.

New York—Scrap brokers are unable to cope with demand for steel grades, but report cast grades as being in fair supply, although tighter than a month ago.

Pittsburgh—Results of the current government - sponsored scrap drive still are unsatisfactory. However, most trade observers think too little time has elapsed under the accelerated collection effort to permit of sound conclusions as to results of the drive. Meanwhile, stocks vary at steel producing plants in this area. Some works appear to be plentifully supplied. At any rate their stocks were at such level recently NPA ordered their intake of scrap cut off. Included are Jones & Laughlin Steel Corp. and American Locomotive Co. among others. At the same time, other works in the area appear on the ragged edge so far as scrap inventory is concerned. U. S. Steel plants in the district, for instance, are reported working on only 4-days' stockpile.

Detroit—Serious threat to Detroit's scrap generation comes from a strike at Borg-Warner plants, which if of long duration will force the closing of many automakers. Trading is quiet. Foundry demand is spotty some shops gradually reducing melt and many taking pig in preference to scrap.

Cleveland—Widespread speculation on possible upward revision in steel

prices is tending to slow down the flow of scrap. There will be some tendency to withhold material, to the extent government regulations permit, so long as there is a possibility higher prices may be allowed on scrap.

Cincinnati—Brokers and dealers are disappointed with scrap tonnage coming out, as mill and yard stocks show subnormal seasonal volume.

Warehouse . . .

Warehouse Prices, Page 149

Pittsburgh—District warehouse operators are encouraged by action of the National Production Authority in raising their steel quotas to 100 per cent of base period receipts. There is some question, however, whether distributors' stocks will be materially enlarged as result of this move. Some sellers think the increased tonnage made available to them will fall short of making up the void occasioned by loss of tonnage formerly open to the warehouses from the so-called "free" area of supply. This "free" steel faded out with the closing up of the open end of the Controlled Materials Plan. Since the amended warehouse regulation does not become effective until first quarter no change in distributors' supply conditions is indicated

San Francisco—Boost in warehouse allotments to 100 per cent of the base period from the current 85 per cent will be of some help, but distributors point out that their business volume has increased greatly over the levels of the first nine months of 1950, taken as the base period by the NPA.

Boston — Suppliers in some cases are getting slightly more tonnage. Strip and bessemer bars are included. Limited tonnage is available for which mills have no tickets from direct buyers. Slight, if any, improvement is registered in receipts of plates, shapes and carbon bars.

Los Angeles—Smaller steel receipts, coupled with slightly weaker demand from some quarters, reduced warehouse sales in September 10 per cent from August levels. Demand has quickened for small flat angles and small bar sizes.

Seattle—Warehouses report larger defense orders and less general construction buying. Total volume continues unchanged. Plates, sheets, reinforcing and cold-finished items continue in short supply. Nails and wire products have eased materially and for the first time in several years are fairly plentiful. Warehouse allotments are being received, but inventories remain below normal. Turnover would be much higher if stocks were available. Distributors hope requests for price increases may be approved soon.

Fasteners . . .

Bolt, Nut, Rivet Prices, Page 147

Pittsburgh—Extent to which steel supplies of bolt and nut producers will be adversely affected by charging third quarter carryover tonnage on mill books against fourth quarter allotments is uncertain. Producers have been in receipt of steel in better volume lately than was the case some time back. However, substantial carryover from third quarter on their account is reported as the mills were uable to ship all of the tonnage for which they were committed. Expectations are fastener consumers in the majority of instances will not be greatly penalized by charging leftover third quarter shipments against fourth quarter tonnage, since shipments for the latter period in all likelihood, in any event, would be delayed to the extent of the third quarter carryover.

Rails, Cars . . .

Track Material Prices, Page 145

New York — Domestic freight car awards spurted in September to 9657 units from 1828 in August, and raised the number on order as of Oct. 1 to 140,135, says American Railway Car Institute and Association of American Railroads.

Domestic freight car deliveries in September increased to 8533 from 7183 cars in August.

New York—Norfolk & Western railroad placed 40,000 tons of rail, 30,000 going to the United States Steel Co., and 10,000 to Bethlehem Steel Co.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

500 tons, additional buildings, State Teachers College, New Haven, Conn., to Connecticut Steel Co., that city, through Fusco-Amatruda Co., that city, general contractor.

250 tons, warehouse and office, Roskin Distributing Co., East Hartford, Conn., to City Iron Works Inc., Hartford, Conn.; Bartlett & Brainerd, Hartford, general contractors.

STANDS 50,000 LB. LOADS
60 seconds after application
SWIFT-FLOOR
FLOOR RESURFACER
No production delays. Just prime, fill, tamp—over wood, concrete, steel for new floor or patch. Write for free book!
"MONROE MAINTENANCE MATERIALS"
THE MONROE COMPANY, INC.
CLEVELAND 6, OHIO

MATHEWS
CONVEYERS
Since 1905. Engineers and manufacturers of Conveyers and Conveyer Systems for the Metal-working Industries.
Three modern plants. Engineering Offices in All Principal Cities. There's an engineering Sales Office near you.
MATHEWS CONVEYER CO.
ELLWOOD CITY - PENNSYLVANIA
SAN CARLOS - - CALIFORNIA
PORT HOPE - ONTARIO, CANADA

HAVE YOU SEEN THIS NEW BOOKLET?
IT TELLS HOW TO DO THE HARD JOBS
how to clean metals in aircraft production

Better cleaning cuts costs in aircraft production. This 48-page illustrated booklet outlines all the big cleaning jobs. Have you seen the latest Oakite recommendations on:

- How to clean aluminum in preparation for anodizing? *See page 4.*
- How to prepare aluminum for spot welding? *See page 10.*
- How to prepare aluminum for painting? *See page 15.*
- How to clean aluminum before and after heat treating? *See page 20.*
- How to strip paint from aluminum? *See page 22.*
- How to clean magnesium? *See page 27.*
- How to select and install cleaning tanks, rinse tanks, and spray-washing machines? *See pages 31 to 35.*
- How to treat water in paint spray booths? *See page 36.*
- How to clean engine test cells? *See page 40.*

FREE For a copy of *"How to clean metals in aircraft production"* write Oakite Products, Inc., 34E Thames St., New York 6, N. Y.

SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS • METHODS • SERVICE
Technical Service Representatives Located in Principal Cities of United States and Canada

265 tons, high school, Millsbury, Mass., to Stafford Iron Works, Worcester, Mass., through Neri Construction Co., Millsbury, general contractor.

150 tons, state highway bridge, Westfield, Mass., to Bethlehem Steel Co. through E. T. O'Neil & Son, Holyoke, Mass., general contractor; 45 tons of reinforcing bars to Truscon Steel Co., Youngstown.

125 tons, building, St. Joseph's Hospital, Reading, Pa., to Reading Metalcraft Co., that city.

100 tons or more, student union building, University of Maine, Orono, Me., to Bancroft & Martin Rolling Mills, South Portland, Me.; Consolidated Construction Co., Portland, general contractor; reinforcing bars to Fabricated Steel Products, Inc., Boston.

100 tons, school, Lunenberg, Mass., to Stafford Iron Works, Worcester, Mass.; D. D. Snyder & Sons, Gardner, Mass., general contractor.

STRUCTURAL STEEL PENDING

2000 tons, five steel frame warehouses, Army supply depot, Auburn, Wash.; bids to U. S. engineer, Seattle, late October.

2220 tons, state bridge, Lancaster county, Pennsylvania; bids Nov. 2.

875 tons, state bridge, Beaver county, Pennsylvania; bids Nov. 2.

850 tons, three state bridges, Sussex county, Delaware; James Julian, Elsmere, Del., low on general contract.

305 tons, state bridge, Lancaster county, Pennsylvania; bids Nov. 2.

200 tons, 614-foot state highway bridge, Powell county, Montana; bids to Helena, Oct. 11.

225 tons, state girder railroad underpassing, Vancouver, Wash.; bids to Olympia, Oct. 25.

265 tons, state bridge work, Lehigh and Northhampton counties, Pennsylvania; bids Nov. 2.

125 tons, three bridges, forest road near Hungry Horse, Mont.; bids to Bureau of Reclamation, Denver, early 1952.

120 tons, steel stringer bridge, Colebrook-Lemington, N. H.; bids in; also 45 tons, steel bearing piles and 40 tons, reinforcing steel.

REINFORCING BARS . . .

REINFORCING BARS PLACED

2100 tons, outside facilities Ladd Field, Alaska, to Bethlehem Pacific Coast Steel Corp., Seattle; Peter Kiewit Sons Co., Seattle, general contractor.

1100 tons, municipal hospital, Springfield, Mass., to Truscon Steel Co., Boston; Thompson-Starrett Co., Inc., New York, general contractor.

200 tons, Weyerhaeuser Timber Co., kraft mill, Everett, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle.

150 tons, facilities at Elelson air field, Alaska, to Bethlehem Pacific Coast Steel Corp., Seattle; Birch-Lytle-Green, general contractors.

240 tons, buildings, General Radio Co., West Concord, Mass., to Bethlehem Steel Co. (Hutchins Co., Boston, general contractor.

150 tons, junior high school, Norwalk, Conn., to Fox Steel Co., Orange, Conn.; John Zandonella, Bridgeport, Conn., general contractor; Port Chester Iron Works, Port Chester, N. Y., 50 tons structural steel.

100 tons, factory building, Norden Instruments, Inc., Milford, Conn., to Bethlehem Steel Co.; Frouge Construction Co., Bridgeport, Conn., general contracting.

REINFORCING BARS PENDING

200 tons, cold storage fish warehouse, Port of Seattle, Seattle; Noble W. White, Seattle, general contractor.

100 tons, state highway bridge, Powell county, Montana; bids to Helena, Oct. 11.

Unstated, outside facilities Ladd Field and Fairbanks, Alaska, Peter Kiewit Sons Co., Seattle, and Kuney-Johnson Co., Seattle, low, $8,193,313 and $1,060,000 respectively.

Unstated, highway construction, including 11 bridges and viaducts, Oregon state; bids to highway commission, Portland, Oct. 11-12.

PLATES . . .

PLATES PLACED

240 tons, tanks, Harrisburg Gas Co., Harrisburg, Pa., to Bethlehem Steel Co.

120 tons, steel piling, Army Alaskan project, to Bethlehem Pacific Coast Steel Corp., Seattle.

PLATES PENDING

Unstated, nine fuel storage tanks, four Montana Army installations; bids to U. S. Engineer, Seattle, late October.

Unstated tonnage, 250,000-gallon elevated steel water tank, Blue Grass Ordnance depot, Kentucky; bids Oct. 18, Corps of Engineers, Louisville.

PIPE . . .

CAST IRON PIPE PLACED

400 tons, 24 inch water mains for Portland, Oreg., to Pacific States Cast Iron Pipe Co., Provo, Utah.

STEEL PIPE PLACED

Unstated, 33,000 feet, various sizes, to Pacific Water Works Supply Co., Seattle, for King County district No. 79; Argentieri & Colarossi, Seattle, general contractors.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Erie, 12 diesel-electric locomotive units, three 1500-hp general purpose and two 1200-hp yard switching units, to Electro-Motive Division, General Motors Corp., LaGrange, Ill.; four 1600-hp general purpose units to American Locomotive-General Electric Companies, Schenectady, N. Y.; four 1600-hp general purpose units to Baldwin-Lima-Hamilton Corp., Eddystone, Pa.

RAILS PLACED

Norfolk & Western, 40,000 tons of rail, 30,000 tons to United States Steel Co. and 10,000 tons to Bethlehem Steel Co.

Perforated **METALS and MATERIALS**

No Job Too Small— None Too Large at H & K

CATERING TO THE NEEDS of every customer—large or small—has been the guiding principle at H & K ever since 1883. Your order may call for one sheet of special perforations . . . or it may be for several thousand in a standard pattern. Regardless of its size, H & K treats every order with equal attention, well knowing that proof of real success lies in the long and continued satisfaction of H & K customers.

FLEXIBLE FACILITIES
PROMPT SERVICE
LOW COST

H & K Perforated Metals . . . Stainless Steel, Steel, Monel, Brass, Everdur, Herculoy, etc.

H & K Perforated Materials . . . Plastics, Plywood, Rubber, Fabrikoids, etc.

H & K . . . your headquarters for screens, filters, strainers, grilles, etc. Write at once for complete information.

Also Remember H & K Grilles . . . for Beauty . . . for Utility . . . FOR LIFE!

The Harrington & King Perforating Co.

5634 FILLMORE ST., CHICAGO 44, ILLINOIS
114 LIBERTY ST., NEW YORK 6, N. Y.

This is an Aluminum die casting made by ALCOA

From design help to on-schedule completion, Alcoa die-casting facilities are noted for dependability . . . in submitting bids promptly . . . in meeting or beating specifications. Backed by 63 years of aluminum experience, staffed by "old hands" at aluminum die casting, Alcoa's great plants offer unmatched facilities for making your die castings.

For details, see your local Alcoa representative, listed under "aluminum" in your classified phone book. Or write: ALUMINUM COMPANY OF AMERICA, 1902K Gulf Building, Pittsburgh 19, Pa.

ALCOA *Aluminum* DIE CASTINGS

Metalworking Briefs . . .

CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

Budd Builds $6 Million Plant

Budd Co., Philadelphia, is constructing a plant adjacent to its automobile-body components plant in that city to machine, weld and paint tank hulls and turrets for the Army under a subcontract from Chrysler Corp., Detroit. Cost of the project, including machinery is $6 million. Completion of the building, including installation of much of the machinery, is scheduled for March, 1952.

Tool Firm Expands Line

Cleveland Pneumatic Tool Co., Cleveland, purchased the Clayborne engine stand equipment line from Clayborne Mfg. Co., Chicago. Included in the transaction are complete patent and manufacturing rights, machinery, tools and the entire inventory of finished products and materials in process for Clayborne engine assembly and overhaul stands, dollies, racks, brackets and adapter frames. Transfer of equipment from Chicago to Cleveland is under way.

Can Plant Doubles Capacity

Current expansion program at American Can Co.'s St. Paul plant is virtually completed. Several new production lines, each capable of making up to 400 cans a minute, have been installed. These additions practically double the plant's container manufacturing capacity. New production equipment includes facilities for applying protective coatings on cans as well as coating ovens, bodymakers, flangers and advanced testing apparatus.

Tipaloy Names Distributor

Tipaloy Inc., Detroit, appointed Weldit Inc., that city, as national distributor for Tipaloy resistance welding electrodes. Otis L. Smith is president of Weldit Inc.

Machinery Firm Expands

Porter-Cable Machine Co., Syracuse, N. Y., purchased for addition to its plant holdings the former Kaylon Cutlery building at 241 Wolf St., that city. It has about 15,000 square feet of floor space.

Weiskittel Improves Plant

Harry C. Weiskittel Co. Inc., 4901 Pulaski Highway, Baltimore, is erecting an electric bridge crane runway, 60 by 258 feet. Earlier this year the company completed a 25 by 175 foot building to house its die and pattern shop. The company is a producer of cast iron soil pipe and fittings, gray iron castings and a manufacturer of domestic gas ranges, cookers, etc.

Riggs Distler Rebuilding

Riggs Distler & Co. Inc., 216 North Calvert St., Baltimore, sheet metal fabricator, plans to erect a pipe shop at 6001 Erdman Ave. The company also plans to begin work soon on another building for its sheet metal shop at the Erdman address, thus grouping all manufacturing activities at the new location. D. Anderson Murphy is president.

Machine Firm Incorporated

Cazenovia Precision Machine Co. Inc. was incorporated in Buffalo by John B. Desilvey, Brainard E. Prescott and George H. Trefts.

Scrap Smelter Enlarges Yard

United Iron & Metal Co. Inc., 630 South Catherine St., Baltimore, processor of aluminum and other scrap metal, awarded a contract for the erection of a structure at 910 Millington Lane, an enlargement of its Catherine street yard. The company also maintains plants at 4201 East Monument St. and 4300 and 4400 Pulaski Highway. Jacob S. Shapiro is president.

Melpar Inc. Changes Hands

Westinghouse Air Brake Co., Wilmerding, Pa., acquired all the stock of Melpar Inc., Alexandria, Va., and Cambridge, Mass. Melpar has prime contracts with the armed services covering the fields of sonar, radar, communications, guided missiles, computers and miniaturization.

Tool and Die Firm Moves

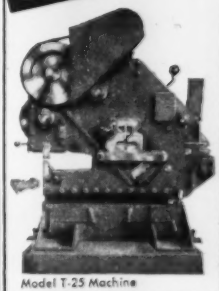
Wilhelm Tool & Die Co.—metal stampings, tools, dies, etc.—Baltimore, moved from 608 East Pratt St. into larger quarters at 605 S. Luzerne Ave., that city. The new quarters will comprise approximately 8000 square feet. Fred R. Wilhelm is owner.

Chain Belt Appoints Agent

Chain Belt Co., Milwaukee, appointed Cate Equipment Co. as its district sales office in the Salt Lake City, Utah, area. Chain Belt makes power transmission equipment, chains and sprockets, flexible couplings, chain and belt conveyors, bucket elevators, sanitation

IN STOCK

NEW



Model T-25 Machine

UNIVERSAL IRONWORKER

ARMOR PLATE CONSTRUCTION

WORMSER

Model T-15; T-25

— SPECIFICATIONS —

	Model T-15	Model T-25
to Punch	7/8" x 7/16"	1" x 9/16"
to Shear		
Plates	7/16"	1/2"
Flat Bars	3" x 9/16"	3-3/16" x 5/8"
Tees	3-1/8" x 5/16"	4" x 3/8"
Angles	3-1/8" x 5/16"	4" x 3/8"
Round Bars	1-3/16"	1-3/8"
Square Bars	1"	1-1/4"

Available in Triple Combination Vertical and Horizontal Punches and Shears—also *individual* machines.

MOREY MACHINERY CO., Inc.

410 Broome St., New York 13, N. Y. • CAnal 6-7400

Exclusive Distributors for Continental United States

Sales Territories Open

PRODUCERS OF *Hot Rolled* ELECTRIC FURNACE QUALITY

BARS • SMALL SHAPES • STRIP

BOIARDI STEEL CORPORATION

300 Lower Market St. Milton, Penna.

COWLES

GANG SLITTING KNIVES

OVER 30 YEARS EXPERIENCE

Standard for *Service* and *Durability*. Ground to extremely close Tolerances and Finish. Made by *Toolmakers*.

COWLES TOOL COMPANY

2086 W. 110th ST. CLEVELAND 2, OHIO

Tips on barrel-finishing
MAKE TEST RUNS under actual production conditions before establishing operating procedure. Pre-determine exact size and amount of abrasive, ratio of parts to abrasive, amount of water, amount and type of cleaner, and barrel rpm for best results.
USE A CLEANER with a rust preventive agent when ferrous parts are tumbled. Dry and rust-proof parts immediately after barrel-finishing.
SEPARATE WORK FROM ABRASIVE with hand screens, when production is small. Use mechanized rubber-coated screens where production is large. Magnetic or non-magnetic separators are also available.
SCREEN TUMBLING ABRASIVE periodically, to maintain close grading. Grinding action within barrel eventually wears grains down. Periodic screening assures consistently uniform results.
ADD NEW ABRASIVE to the load periodically to compensate for loss of abrasive through gradual wear. This keeps ratio of abrasive and parts at best predetermined figure.

SPECIFY Norton ALUNDUM* Tumbling Abrasive for continuous cutting action — fast, positive cut — long, productive life. If you do not have barrel-finishing equipment, let Norton make test runs for you — at no obligation. Whether or not you have equipment, get your copy of Norton's new, informative, free booklet "Barrel-Finishing with ALUNDUM Tumbling Abrasive" — full of practical hints. Ask your Norton distributor or representative for Form 501. Or write us direct.

NORTON COMPANY, Worcester 6, Mass.
Distributors In All Principal Cities

NORTON
ABRASIVES
Making better products to make other products better

*Trade-Mark Reg. U.S. Pat. Off. and Foreign Countries

and waste treatment equipment.

Furnace Output To Rise

Sargeant & Wilbur Inc., Pawtucket, R. I., builder of industrial furnaces, opened a second plant to meet demand that is more than double that of 1950. Aircraft is a large factor in expansion with use of stainless and other alloys at high level. Furnace deliveries range from four to five months.

Forms Machine Tool Firm

Rite-Way Tool Co. was organized by Oliver B. Schmeltz and Thomas M. Rees to market standard and special metal cutting tools and machine tool accessories. Headquarters of the firm are at 1612 Potomac Ave., Pittsburgh. Rees Machinery Co., 1012 Empire Bldg., Pittsburgh, will continue to function as heretofore.

Zollner Gets Al-Fin License

A license for manufacture of molecular bonded bi-metallic pistons was granted by Engine & Airplane Corp., Farmingdale, N. Y., to Zollner Machine Works, Fort Wayne, Ind. Under the license agreement terms, Aluminum Co. of America and Bohn Aluminum & Brass Corp. will use the patented Al-Fin process in bonding and casting operations in production of piston castings for Zollner.

Plating Facilities Offered

A booklet, offering its metal plating facilities for rearmament wherever they can be used to speed defense production and conserve vital materials, was sent by American Nickeloid Co., Peru, Ill., to production executives and defense procurement offices. The booklet enumerates in detail the company's machinery, tools, presses, power, dock facilities, etc. It also describes the plating finishes and forms of plated metals available.

De Laval Moves Offices

De Laval Separator Co. moved its executive, sales, advertising and general offices to its new De Laval building, Poughkeepsie, N. Y. A New York office is maintained at 165 Broadway for internal executive use and as headquarters for the marine sales department of the Industrial Division.

New Owners Take Over Firm

Detroit Sheet Metal Works, Detroit, is operating under new ownership and management with Wilbur Kraus as president and Harvey J. LaDouceur Jr. as vice president and general manager. B. DeVore is works superintendent. The company will continue to make industrial heating equipment, paint spray systems, industrial ovens and washing machines, and dust-collecting systems.

Aerojet Plans Expansion

A Defense Production Administration certificate of necessity for $1,076,880 was issued to Aerojet Engineering Corp., Azusa, Calif., for construction of buildings and purchase of additional machinery. The firm produces jet-assist take-off units, rockets, missile boosters, and rocket engines.

Brown To Open Plant Nov. 1

E. C. Brown Co., Rochester, N. Y., will begin full-time manufacturing operations Nov. 1 in Canandaigua, N. Y., occupying the former plant of Velo-King Co. The Brown firm recently purchased the plant building and is installing equipment for the production of spraying equipment.

Cleco Appoints Distributor

Cleco Division, Reed Roller Bit Co., Houston, appointed Dawson MacDonald Co. Inc., Boston, and Louisville Mill Supply Co., Louisville,

COLDER THAN KOREA?: During tests at Westinghouse Aviation Gas Turbine Division, South Philadelphia, Pa., a new fuel pump is subjected to the low temperatures it will encounter at high altitudes. Jet engine accessories must function at temperatures as low as 67 degrees below zero. The alcohol that is circulated through the fuel pump is cooled with powdered dry ice in the cold-chest in the foreground. Fuel lines are insulated with crinkled aluminum foil that is pressed in place by hand

mechanical
POWER PRESSES
FOR
ALL INDUSTRIES
ZEH & HAHNEMANN CO.
56 AVENUE A, NEWARK 5, N. J.

perforated metals
for all industry
STEEL AVAILABLE FROM ACCURATE'S STOCK

When it comes to perforating—metal, masonite, or any other material, check with Accurate Perforating Company. Accurate offers you a wide selection of perforating dies, quick and dependable service, best of all—a price that's hard to beat! For complete information, write today for your free catalog on Accurate perforated materials.

ACCURATE
PERFORATING COMPANY
1101 S. Kedzie Avenue
Chicago 12, Illinois

"Somebody better tell him about the Fischer File!"

SAVE TIME AND TROUBLE . . . send for the Fischer File. It's packed with complete specifications on standard brass nuts, helpful charts on Pitch Diameter Tolerances and explanations of Unified and American Thread limits. Send today!

SEND THIS COUPON TODAY

S-3

Fischer SPECIAL MFG. CO.
CINCINNATI 6, OHIO

Send at once my personal copy of the Fischer File.

Name _____ Title _____

Company _____

Address _____ City _____ Zone _____ State _____

Quantity
PRODUCTION
of
GREY IRON CASTINGS

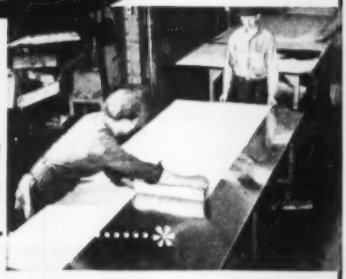
ONE OF THE NATION'S
LARGEST AND MOST MODERN
PRODUCTION FOUNDRIES

ESTABLISHED 1886
THE WHELAND COMPANY
FOUNDRY DIVISION

MAIN OFFICE AND MANUFACTURING PLANTS
CHATTANOOGA 2, TENNESSEE

Mystik Protecto-Mask

SAVE that polished surface!



Here's sure protection for those expensive, highly polished surfaces—stainless steel, aluminum, plastics, many more!

• Keep them protected during *fabrication, storage, in shipment.* • MYSTIK Protecto-Mask is *Self-Stik* . . . goes on easily from the roll to surface, peels off easily. Leaves no residue. • Protects against scratches, and production damage . . . cushions blows . . . shields against splatter from welding arc. Can be used for layout and diagramming.

Ask your supplier or write for full information and sample. Mystik Adhesive Products, 2678 N. Kildare, Chicago 39.

SCREW MACHINE PRODUCTS made to your order!

SET SCREWS CAP SCREWS SPECIAL PARTS
STEEL • BRASS • STAINLESS • ALUMINUM
send us your specifications for quotation
SAMUEL J. SHIMER & SONS, Inc. Milton 2, Pa.

THE BELMONT IRON WORKS

STRUCTURAL STEEL—BUILDINGS & BRIDGES
RIVETED—ARC WELDED Cable Address—Beliron
Engineers—Fabricators—Erectors—Contractors—Exporters
Shops—Philadelphia—Eddystone—Royersford
Main Office: Phila. 46, Pa.
New York Office—44 Whitehall St., N. Y. 4, N. Y.

Famous
FOR ACCURACY OF THREADS
LOW COST OF CHASERS
LESS DOWNTIME. 100% DEPENDABILITY
Free Bulletins

THE EASTERN MACHINE SCREW CORPORATION
22-42 BARCLAY ST., NEW HAVEN, CONN.
Pacific Coast: A. J. Berringer, 416 N. San Pedro St., Los Angeles; Canada: F. E. Barber Machinery Co., Toronto

The Cleveland Steel Tool Co.
• PUNCHES • DIES • CHISELS • RIVET SETS •
IF IT'S *RIVETED* YOU KNOW IT'S SAFE
WE FEATURE SPECIAL PUNCHES & DIES
660 E. 82nd ST., CLEVELAND, O.

IF METALWORKING PLANTS
ARE YOUR PROSPECTS . . .

STEEL can put you in touch with the important ones, those that do more than 92% of the industry's business. Tell the buyers and specifiers in these plants of the machines or materials you have for sale through an "Equipment—Materials" advertisement. For rates write STEEL, Penton Building, Cleveland 13, Ohio.

as distributors in their areas for Cleco air tools and accessories.

Motley Markets Rust Buster

James M. Motley & Co., New York, are marketing for the industrial and export trade a special formula rust buster under the trade name of Andy's rust solvent. Railroads, steamship operators and machine tool dismantlers so far lead in using it.

Buffalo Scrap Firm To Build

Harry Fox & Co., 328 Howard St., Buffalo, scrap metal dealer, has purchased more than five acres of land on William street, that city, where it will erect a building with about 20,000 square feet of space.

Metal Removal Co. Moves

A new 15,000 square foot building located at 1546 N. Orleans St., Chicago, houses the general offices and research laboratories of Metal Removal Co. A new catalog, No. 21, carries descriptive matter of the company's products, including abrasive discs and holders, rotary files, carbide end mills, and die and mold finishing specialties.

Marco Plans Plastics Plant

Marco Chemical Co., Sewaren, N. J., awarded Wigton-Abbott Corp., Plainfield, N. J., a contract for construction of a plant for the manufacture of plastics on Elizabeth avenue, Linden, N. J.

West Coast Agent Appointed

Osborn Mfg. Co., Cleveland, appointed Inesco Inc., a newly formed company with headquarters at 3050 E. Slauson Ave., Huntington Park, Calif., as exclusive representative in California for Osborn line of foundry molding equipment. Otto H. Rosentreter, who, as an individual represented Osborn in this area, is president of Inesco.

Railroad Moves Offices

All departments of Birmingham Southern Railroad moved to new quarters. The new address is P.O. Box 579, Fairfield, Ala.

Day Co. Names Distributor

Day Co.—dust control equipment—Minneapolis, appointed R. Dykstra & Co., Detroit, to serve as its representative in Michigan.

AC Spark Plug Expands Plant

AC Spark Plug Division, General Motors Corp., Detroit, is increasing manufacturing floor space at its Dort highway plant by about 590,000 square feet or 50 per cent. The new facilities will be used for manufacture of special defense products, including the recently announced fire control systems for Skysweepers.

Wallander To Build Plant

Wallander Fabricant Steel Co., New York, plans to build a plant near the Hudson river in North Albany, N. Y., at a cost of more than $1 million. The firm is completing negotiations for about 12 acres of land at the site.

New Firm in Planning Stage

A new petroleum chemical firm may be organized to build a plant in Houston. The company, to be known as Alamo Chemical Co., would be formed by General Aniline & Film Co., Borden Co., and Phillips Chemical Co. Defense Production Authority issued a certificate of necessity authorizing a fast tax write-off of 50 per cent of the cost of a $58,260,000 plant.

Brandt Tool & Die Expands

Brandt Tool & Die Co., Baltimore, which occupies a small plant to the rear of 5210 Fairlawn Ave., is building a new and larger plant at 5241 Fairlawn Ave., that city.

Machine Tool Center Set Up

Pratt & Whitney Aircraft Division, United Aircraft Corp., East Hartford, Conn., leased 70,000 square feet of floor space in Manufacturers Foundry Co.'s building in Waterbury, Conn. The Waterbury facility will be used as a receiving center and transfer point for the thousands of new machine tools required for expanded jet and piston engine production at Pratt & Whitney's manufacturing plants in East Hartford, Southington and North Haven, Conn.

Incorporation Papers Filed

Charters of incorporation were filed by the following with the secretary of state's office, Dover, Del. The companies serving as principal office are shown in parenthesis: Brogan-Killoran Corp., steel, and Klingelhofer Machine Tool Co. Inc., tools (Prentice-Hall Corporation System Inc., Dover); Exterminator Corp. of America, machinery (United States Corporation Co., Dover); Equitable Steel Corp., metals, Prudential Steel Corp., metals, Wheeler-Nicholson Inc., machinery (Corporation Trust Co., Wilmington, Del.); McNey-Kelbaugh, machinery (Tax Research Bureau Inc., Wilmington); and David B. Lilly Co. Inc., machinery, with principal office of the firm located at 1206 Market St., Wilmington.

TOLEDO STAMPINGS

Let us make your stamping problems our problems. Our Engineering Department has had many years of experience in development work and our production facilities include not only a modern press department, but facilities for copper hydrogen brazing and other types of welding and assembly work. We solicit your prints and inquiries.

Toledo Stamping and Manufacturing Co.

90 Fearing Blvd., Toledo, Ohio
Detroit Office: 12800 Puritan Ave., Detroit 27, Mich.
Chicago Office: 333 North Michigan Ave., Chicago, Ill.

CONSERVE CUTTING TOOLS... buy the RIGHT CUTTING FLUID

D.A. Stuart Oil CO. LIMITED
EST. 1865
2735-37 SOUTH TROY ST., CHICAGO, 23

OHIO LOCOMOTIVE CRANES

GASOLINE • DIESEL
ELECTRIC • STEAM

25 TO 40 TON CAPACITY

THE OHIO LOCOMOTIVE CRANE CO.
BUCYRUS, OHIO

for the RIGHT answers to YOUR alloy fastening problems . . .

CALL HARPER!

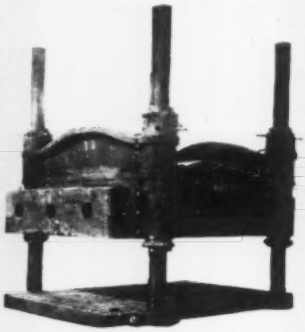
HARPER CAN HELP YOU... because Harper makes them *all*—has fastenings in exactly the *right* alloy, size, type and finish you need. Harper deals exclusively in nonferrous and stainless steel fastenings—bolts, nuts, screws, rivets and accessories in brass, bronze, copper, aluminum, Monel and stainless steel that provide maximum resistance to corrosion, heat, abrasion and stress. Over 7000 items in stock ready for delivery from warehouses and distributors, nationwide. Mail coupon for new catalog.

HARPER
EVERLASTING FASTENINGS

The H. M. Harper Company
8207 Lehigh Ave., Morton Grove, Ill.
Send my copy of new Harper Catalog.
(Please print—use margin for more room.)

Name.....
Address.....
City.....State.....

MANY ATTRACTIVE "BUYS" in
Hard-to-find HEAVY MACHINERY and SHEET METAL EQUIPMENT
WELL-WORTH INVESTIGATING!



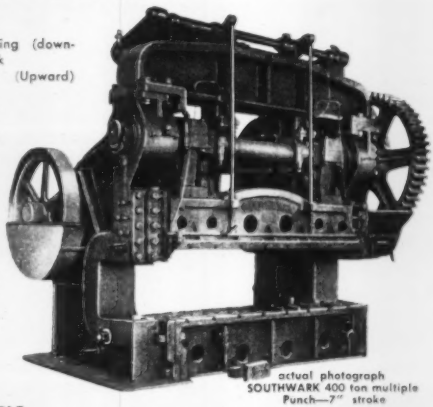
actual photograph
MACKINTOSH HEMPHILL hydr.
Press (Upward) 30" stroke

POWER PRESSES

TOLEDO no. 88, 16" stroke
BETHLEHEM STEEL Hydr. flanging (downward) cap. 1200 ton; 66" strk
MACKINTOSH-HEMPHILL hydr. (Upward) 60" stroke; intensifier
BETHLEHEM 16" stroke; hydraulic
MACKINTOSH-HEMPHILL 4-post hydr.—24", 36", 60" strokes

PUNCHES—MULTIPLE

SOUTHWARK 400 ton, 7" stroke
WILLIAMS & WHITE 6" stroke Vert.
CLEVELAND No. 1, 6" stroke
HILLES & JONES No. 3 Vertical
MASSILLON No. 5, 60" stroke



actual photograph
SOUTHWARK 400 ton multiple
Punch—7" stroke

ALSO AVAILABLE

CAR WHEEL BORING LATHE—BETTS CONSOLIDATED
AXLE LATHE—NILES TOOL WORKS
FORGING MACHINES—FORGING ROLLS—AJAX
HAMMERS—Forging, steam—ERIE, CHAMBERSBURG
and many other machine tools and sheet metal equipment

WIRE 'PHONE or WRITE—or better still—INSPECT!

McKEES ROCKS INDUSTRIAL ENTERPRISES Nichol Av., McKees Rocks (Pittsburgh), Pa., PHONE FEderal 1-0746

For Sale

COLD FINISHED BARS

21/32"	Rd. 10/12'	51100	14250 #
1-13/16"	Rd. 10/12'	52100	6500
2-1/16"	Rd. 10/12'	B1112	2650
27/32"	Rd. 10/12'	52100	700

HOT ROLLED BARS

1-3/16"	Rd. 10/12'	52100	7000 #
3½"	Rd. 10/12'	52100	3400
3¼"	Rd. 10/12'	4320	1500
5"	Rd. 10/12'	4320	1100

CORE RODS

5/16" Rd.	H.R.	14' Len.	25000 #
7/16" Rd.	H.R.	14' Len.	8000

SEABOARD STEEL CO., INC. New Haven, Conn.

MACHINE TOOLS FOR SALE

PLANERS: 63 x 54 x 12' Powell 4 head 25 HP Reversing motor, 36" x 36" x 8' Cincinnati 1 rail head, 1 side head belt drive.

HORIZONTAL BORING MILLS: 2—No. 0 Giddings & Lewis 3¼" bar, 2—No. 35 Landis Floor Type 3½" bar, No. 33 Lucas 4½" bar.

SHAPERS: 12" Vernon, 20" G & E.

Now in operation. Available because of plant consolidation. Ask for Dick.

C. H. Wheeler Mfg. Co.
19th and Lehigh Philadelphia, Pa.

RAIL
STEEL PLATE
STRUCTURALS, PIPE,
TUBING, WIRE ROPE,
FERROUS AND NON-FERROUS SCRAP

BOUGHT-SOLD LIQUIDATED

DULIEN STEEL PRODUCTS, Inc.
of Washington
9265 E. Marginal Way - Seattle 8, Wash. - LAndet 6000

BRIDGE CRANES
ARNOLD HUGHES COMPANY
765 Penobscot Bldg. Detroit, Mich.
WOodward 1-1894

WANTED
SEVERAL 36" to 60"
VERTICAL BORING MILLS

Manufactured 1940 or later. Send proposal in writing to Facilities Section, The American Welding & Manufacturing Co., Warren, Ohio.

WANTED
BRIDGE CRANES
ARNOLD HUGHES COMPANY
765 Penobscot Bldg. Detroit, Mich.
WOodward 7-1894

STEEL CAN HELP YOU BUY OR SELL

Used or Surplus Machinery and Equipment. Send in your copy instructions for an advertisement in this column. Your ad will reach the important men in the metalworking and metal-producing industry. Write to STEEL, Penton Bldg., Cleveland.

MATERIALS--USED EQUIPMENT

RAILROAD EQUIPMENT—*FOR SALE*

STANDARD GAUGE FREIGHT CARS

Box, Single Sheathed, 50-Ton
Cabooses, Eight Wheel, Cupola Type
Flats, 50-Ton, Steel Underframe, 40'0"
Gondolas, Composite or All Steel, 50-Ton and 70-Ton
Hoppers, Covered, All-Steel, 50-Ton & 70-Ton
Hoppers, Twin, All-Steel, 50-Ton, Cross Dump
Hoppers, All-Steel, 70-Ton, Cross Dump
Tank, 8,000-Gallon, Class II

EXTRA LONG FLAT CARS

40 & 50-Ton Capacity, Length 70' and 74'

STANDARD GAUGE DUMP CARS

Side Dump, 16-Yd., 30-Ton, Lift Door
Side Dump, 20-Yd., 40-Ton, Lift Door
End Dump, 20-Yd., 50-Ton, Drop Door
End Dump, 10-Yd., 30-Ton, Lift Door

STANDARD GAUGE LOCOMOTIVES

Two Plymouth Diesel-Electric, 45-Ton, Standard Gauge, Type 0-4-4-0, Built 1942

Gasoline—10-Ton to 25-Ton
Diesel-Mechanical—8-Ton to 30-Ton
Gasoline-Electric—35-Ton

One Plymouth Model KC Flexomotive, 65-Ton, Standard Gauge, Type 0-6-0, Built 1940

Send us your inquiries **We Buy Freight Cars for Dismantling** ***Send us your offerings***

IRON & STEEL PRODUCTS, INC.

REPAIR PARTS For All Types of Freight Cars

General Office
13462 S. Brainard Ave.
Chicago 33, Illinois
Phone: BAyport 1-3456

New York Office
50-D. Church Street
New York 7, N. Y.
Phone: BEekman 3-8230

STORAGE TANKS
6,000 Gallon
8,000 Gallon
10,000 Gallon

"ANYTHING containing IRON or STEEL"

CLASSIFIED

Help Wanted

CLEANING ROOM FOREMAN

Experienced foreman for miscellaneous and semi-production steel foundry. Must have thorough knowledge of heat treating. Excellent opportunity for right person. Good salary, insurance, and bonus. State qualifications and expected salary. Location—Detroit area. Write Box 364, STEEL, Penton Bldg., Cleveland 13, O.

Contract Work

10 to 12 ft. lengths
ALL METALS
Also Screw Machine Products to Order
EASTERN
Machine Screw Corp.
New Haven, Conn.
Makers of H & G Die Heads

Opportunities

FOR SALE: GRAY IRON FOUNDRY IN western New York. Open shop, complete organization, operating profitably. Equipped with squeezers for small castings—90 tons monthly capacity. Price $80,000. Write Box 378, STEEL, Penton Bldg., Cleveland 13, O.

Employment Service

SALARIED POSITIONS $3,500 TO $35,000. WE offer the original personal employment service (established 41 years). Procedure of highest ethical standards is individualized to your personal requirements. Identity covered; present position protected. Ask for particulars. R. W. BIXBY, INC., 110 Dun Bldg., Buffalo 2, N. Y.

Help Wanted

MANUFACTURERS' AGENTS WANTED

New concern, manufacturing Resinoid Bonded Grinding Wheels, has available exclusive territories for reliable agents.

INTERNATIONAL ABRASIVE CORPORATION

500 Fifth Ave. New York 18, N. Y.

SUPERINTENDENT FOR NEW ENGLAND STEEL FABRICATING PLANT—STRUCTURAL, PLATE AND MACHINE SHOPS — IN CHARGE OF PRODUCTION, MAINTENANCE AND PERSONNEL. A RESPONSIBLE POSITION FOR A MAN WITH INITIATIVE AND EXPERIENCE. WRITE BOX 376, STEEL, PENTON BLDG., CLEVELAND 13, O.

WANTED—MELTING DEPARTMENT SUPER-intendent. Immediate opening for person having experience in electric arc furnace melting of tool, high speed, stainless, and specialty steels in long-established mill in Pittsburgh district. Should have considerable practical experience, technical background, and ability for handling men. Reply giving complete record of experience, qualifications, age, and references. Write Box 380, STEEL, Penton Bldg., Cleveland 13, O.

FOR CLASSIFIED RATES
And further information write
STEEL, Penton Bldg., Cleveland 13, O.

Help Wanted

DIVISION SALES MANAGER

To take charge of marketing nationally advertised, outstanding, chemically-treated paper wrap that prevents rust. Easily fabricated into bags, cartons, envelopes, and special forms. Unlimited opportunity for sales in metal working, hardware, and metal specialty fields where protection against rust is important. Prefer man in 30's with good sales background and knowledge of packaging field. Permanent connection and good future for right man.

NOX-RUST CHEMICAL CORP.
2429 S. Halsted St., Chicago

SALESMAN

Industrial salesman for well established manufacturer of ferrous and nonferrous products. Two to four years' industrial selling experience necessary with degree in industrial or mechanical engineering desirable but not required. Earnings about $6,000 per year. Write giving full details to Box 374, STEEL, Penton Bldg., Cleveland 13, O.

SALESMAN WANTED FOR STEEL PROCESS-ing and warehouse operation. Commission and salary commensurate with experience and following in Detroit area. Lake Shore Steel, Inc., 9630 Greely Ave., Detroit 11, Mich.

Here's How

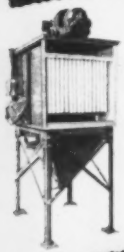
Pangborn Solves these Problems with this Modern Equipment

BLAST CLEANING!

Blast Cleaning Cabinet cleans rust, grime, dirt, paint, etc., from metal parts. Produces a smooth surface on pieces up to 60" x 36". Models from $315.00 and up.

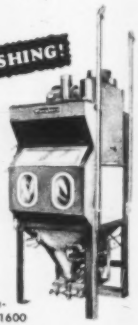
Blast Cleaning Machine removes rust, dirt, scale, etc., is ideal for maintenance work. Cleans large objects such as bridges, tanks, etc., before painting. Six sizes, portable or stationary from $170.00 and up.

DUST COLLECTING!



Unit Dust Collector stops dust at source, minimizes machine wear and tear, reduces housekeeping and maintenance costs. Solves many grinding and polishing nuisances. Models from $286.00 and up.

PRECISION FINISHING!



Hydro-Finish Cabinet uses liquid blast to polish, clean and finish molds, dies, etc. Removes scale, discoloration with minimum hand work. Holds tolerances to .0001". Models from $1295.00 and up.

Write for details on these machines to: Pangborn Corp., 1600 Pangborn Blvd., Hagerstown, Md.

Pangborn

Look to Pangborn for the latest developments in Blast Cleaning and Dust Control Equipment

Advertisers in this Issue

Accurate Perforating Co. 165
Aetna-Standard Engineering Co., The Inside Front Cover
Allis-Chalmers 8, 9
Aluminum Company of America 162
American Brake Shoe Co. 125
American Bridge Co. 155
American Chemical Paint Co. 96
American Shear Knife Co. 160
American Wheelabrator & Equipment Corp. 12
American Zinc, Lead & Smelting Co. 152
American Zinc Sales Co. 152
Associated Spring Corporation 133
"Automatic" Sprinkler Corporation of America 114
Avon Tube Division, Higbie Mfg. Co. 97

Babcock & Wilcox Co., The, Refractories Division 89
Barnes-Gibson-Raymond, Division of Associated Spring Corporation 133
Barnes, Wallace, Co., Division of Associated Spring Corporation 133
Barnes, Wallace, Co., Ltd., The, Division of Associated Spring Corporation 133
Belmont Iron Works, The 166
Bethlehem Steel Co. 1
B-G-R Cook Plant, Division of Associated Spring Corporation 133
Birmingham Committee of 100 101
Bixby, R. W., Inc. 169
Bliss, E. W., Co. 27
Bolardi Steel Corporation 163
Boston Woven Hose & Rubber Co. 117
Brown Co. 45
Bryant Chucking Grinder Co. 119, 120
Buffalo Bolt Co. 126
Bundy Tubing Co. 115
Burt Manufacturing Co., The 134

Camcar Screw & Mfg. Corp. 104
Carpenter Steel Co., The 95
Cincinnati Milling Machine Co., The 55
Cleveland-Cliffs Iron Co., The 148
Cleveland Crane & Engineering Co., The Cleveland Tramrail Division 105
Cleveland Steel Tool Co., The 166
Cleveland Tramrail Division, The Cleveland Crane & Engineering Co. 105
Cold Metal Products Co., The 85
Columbia Steel Co. 14, 15, 90
Cowles Tool Co. 163
Crucible Steel Company of America 157
Cullen-Friestedt Co. 98

Danly Machine Specialties, Inc. 13
Dempster Brothers 36
Detroit Broach Co. 74
Doehler-Jarvis Corporation 87
Dulien Steel Products, Inc. 168
Du-Lite Chemical Corp. 67
Dunbar Brothers Co., Division of Associated Spring Corporation 133

Eastern Machine Screw Corporation, The 166, 169
Eastman Kodak Co., X-ray Division 99

Ferry Cap & Set Screw Co., The 139
Fischer Special Mfg. Co. 165

Gardner-Denver Co. 106
General American Transportation Corporation 73
General Electric Co. 35
Gerrard Steel Strapping Co. 113
Gibson, William D., Co., The, Division of Associated Spring Corporation 133
Gisholt Machine Co. 17, 18, 19, 20
Great Lakes Steel Corporation 60
Greer Hydraulics, Inc. 109

Harper, H. M., Co., The 167
Harrington & King Perforating Co., The 162
Heresite & Chemical Co. 56
Hewitt-Robins, Inc. 121
Hewitt Rubber Division, Hewitt-Robins, Inc. 121
Higbie Mfg. Co., Avon Tube Division 97
Houghton, E. F., & Co. 156
Hughes, Arnold, Co. 168

Illinois Gear & Machine Co. 37
Ingalls Iron Works Co. 98
Inland Steel Co. 46
Insul-Mastic Corporation of America 11
International Nickel Co., Inc., The 42
Iron & Steel Products, Inc. 169

Jeffrey Manufacturing Co., The 127
Jones & Laughlin Steel Corporation 32

Kearney & Trecker Corp. 122
Keystone Steel & Wire Co. 10

La Salle Steel Co. 29
Latrobe Electric Steel Co. 63
Lee Rubber & Tire Corporation, Republic Rubber Division 130
Link-Belt Co. 24
Luria Brothers & Co., Inc. 151

Manross, F. N., & Sons Co., Division of Associated Spring Corporation 133
Master Builders Co., The 111
Master Electric Co., The 23
Mathews Conveyer Co. 161
Meyers, W. F., Co., Inc. 112
Michigan Steel Tube Products Co. 107
Milwaukee Division of Associated Spring Corporation 133
Monroe Co., Inc., The 161
Morey Machinery Co., Inc. 163
Mystik Adhesive Products 166

National-Standard Co., Reynolds Wire Division 135
National Steel Corporation 60
National Tube Co. 90
New York & New Jersey Lubricant Co. 128
Norton Co. 164

Oakite Products, Inc. 161
Ohio Division of Associated Spring Corporation 133
Ohio Locomotive Crane Co., The 167
Orban, Kurt, Co., Inc. 94
Orton Crane & Shovel Co. 131

Pangborn Corp. 170
Philadelphia Gear Works, Inc. 26
Pittsburgher Hotel 112
Public Service Electric & Gas Co. 108

Raymond Manufacturing Co., Division of Associated Spring Corporation 133
Reading Crane & Hoist Corp. 112
Reliance Electric & Engineering Co. 5
Republic Rubber Division, Lee Rubber & Tire Corporation 130
Republic Steel Corporation 93
Reynolds Wire Division, National-Standard Co. 135
Robins Conveyors Division, Hewitt-Robins, Inc. 121
Robins Engineers Division, Hewitt-Robins, Inc. 121
Roebling's, John A., Sons Co. 21
Ross Carrier Co., The 92
Ross Heater & Mfg. Co., Inc. 124
Russell, Burdsall & Ward Bolt & Nut Co. 64
Rust-Oleum Corporation 2
Ryerson, Joseph T., & Son, Inc. 38

Seaboard Steel Co., Inc. 168
Shakeproof, Inc. 25
Sharon Steel Corporation 7
Shell Oil Co. 102, 103
Shepard Niles Crane & Hoist Corporation 116
Shimer, Samuel J., & Sons., Inc. 166
Simonds Gear & Mfg. Co., The 158
Spincraft, Inc. 132
Standard Conveyor Co. 110
Stuart, D. A., Oil Co., Ltd. 167
Sun Oil Co. 68
Surface Combustion Corporation 30, 31

Tennessee Coal, Iron & Railroad Co. 14, 15
Tennessee Products & Chemical Corporation 4
Tide Water Associated Oil Co. 34
Timken Roller Bearing Co., The Back Cover
Toledo Stamping & Manufacturing Co. 167

Uddeholm Company of America, Inc. 118
United Chromium, Inc. 33
United Manufacturing Co., The 129
United Screw & Bolt Corporation 41
United States Rubber Co. 146
United States Steel Co. 14, 15
United States Steel Corp., Subsidiaries 14, 15, 90, 113, 155
United States Steel Export Co. 14, 15, 90, 155
United States Steel Supply Co. 14, 15

Vanadium Corporation of America 140
Veeder-Root, Inc. 3

Washburn Wire Co. 22
Wean Equipment Corporation 71
Werner, R. D., Co., Inc. 6
Westinghouse Electric Corporation 100
Wheland Co., The 166
Whitcomb Locomotive Co., The 16
Willson Products, Inc. 136
Wilson, Lee, Engineering Co., Inc., The Inside Back Cover
Wisconsin Motor Corporation 128

Yoder Co., The 28

Zeh & Hahnemann Co. 165

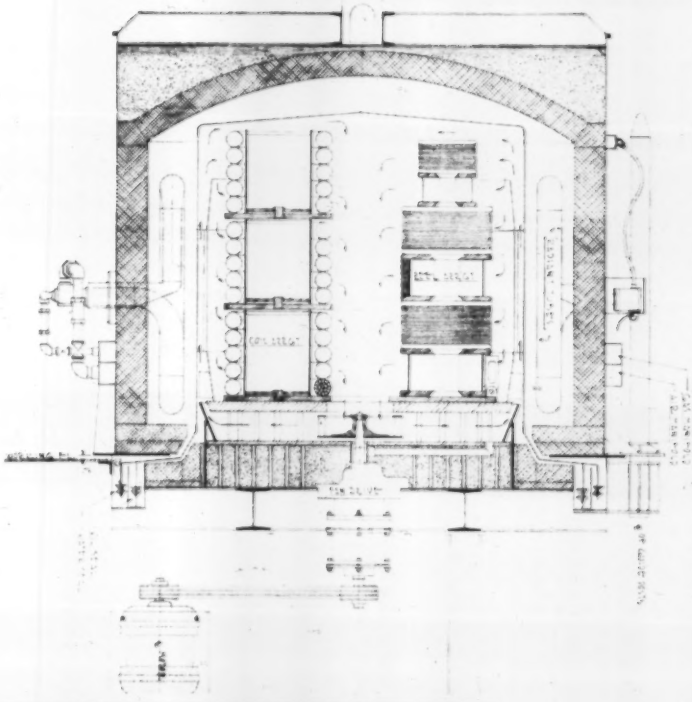
Table of Contents Page 5

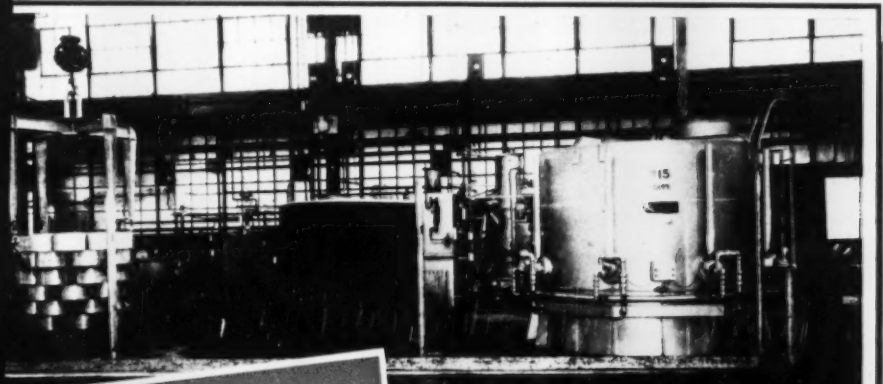
Classified Advertising Pages 168, 169

HIGH CONVECTION ANNEALING

For Ferrous and Non-Ferrous Wire

THE Lee Wilson radiant convector annealing furnace is now ready for applications to WIRE ANNEALING. Tremendous recirculated gas velocities produced by 15 HP fan drives give finishes and yields far beyond previous standards set for wire annealing.





Lee Wilson ENGINEERING Co., Inc.

20005 WEST LAKE ROAD • CLEVELAND, OHIO

Telephone ED-1-6600

BELL TYPE FURNACES ★ RADIANT TUBE HEATING ★ ANNEALING PROCESSES

How TIMKEN® bearings help flatten the cost of flattening sheets on McKay levelers

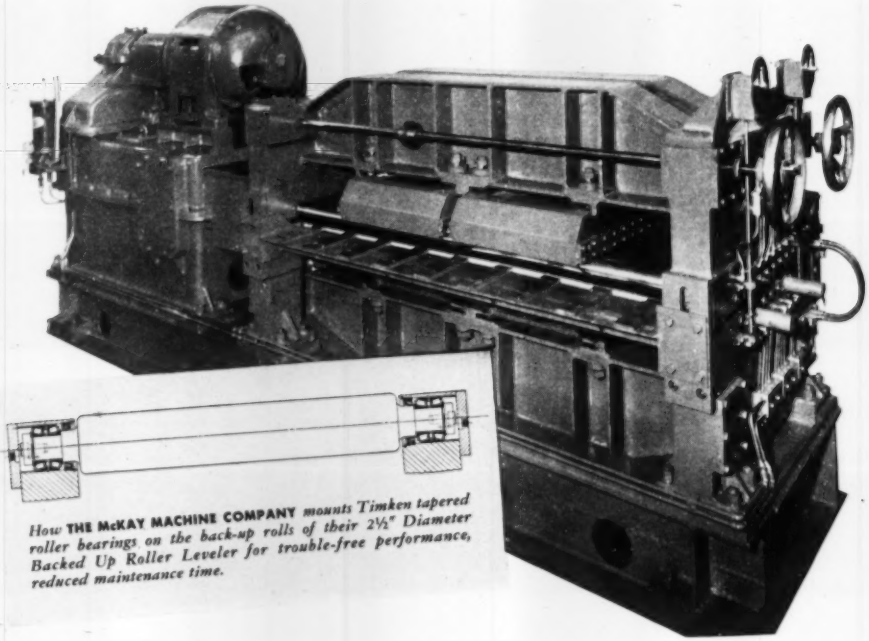
ONE big reason for the low-cost operation of this McKay leveler is the 68 Timken® bearings on the back-up rolls. Timken tapered roller bearings carry the heaviest loads, practically eliminate friction, and help keep the leveler operating smoothly with minimum time-out for maintenance and repairs. And because Timken bearings help prevent roll deflection, extremely wide sheets can be handled with ease.

Line contact between the rollers and races of Timken bearings provides extra load-carrying capacity. More effective closures are possible with Timken bearings, because housing and shaft are kept concentric. Lubricant is kept in, dirt and grit kept out.

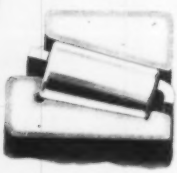
The tapered construction of Timken bearings enables them to take radial and thrust loads or any combination. And Timken bearings operate freely, frictionlessly, due to incredibly smooth surface finish and true rolling motion.

No other bearing can give you *all* the advantages you get with Timken tapered roller bearings. Make sure all the equipment you build or buy is Timken bearing equipped. Always look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



How **THE McKAY MACHINE COMPANY** *mounts Timken tapered roller bearings on the back-up rolls of their 2½" Diameter Backed Up Roller Leveler for trouble-free performance, reduced maintenance time.*



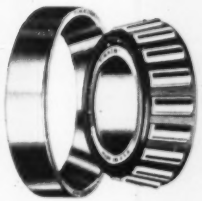
GREATER LOAD AREA

Because the load is carried on the *line* of contact between rollers and races, Timken bearings carry greater loads, hold shafts in line, wear longer.

The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

TIMKEN

TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL AND THRUST ○ LOADS OR ANY COMBINATION